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Relationships Between Students' Scores on KCCT and CTBS

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Abstract

As a part of Kentucky's ongoing examination of the validity and reliability of the Kentucky Core Content Test (KCCT), a major component of the Commonwealth Accountability Testing System (CATS), KCCT scores were compared with CTBS scores for the period from 1999-2003. This report extends prior research conducted by Bacci, Koger, Hoffman, and Thacker (2003), which compared KCCT scores with ACT scores. Results from the present study were similar to the findings from the earlier study. KCCT scores are correlated with CTBS scores at about the same level as KCCT scores are correlated with ACT scores. Correlations between like subjects typically ranged from $r = .50$ to $r = .74$, indicating that while the different measures are related, they are not so highly related as to indicate that they are testing the same set of content and skills. They are within the "Goldilocks" range (Hoffman, 1998), or not so high that they indicate that the tests do not have important differences, but not so low as to indicate that they measure entirely different content. Analyses were also conducted to compare performance on KCCT with performance on CTBS for students from varying backgrounds. Overall, the results indicate that KCCT has no more differential impact than CTBS with regards to gender, socioeconomic status, and ethnicity.

Relationships Between Students' Scores on KCCT and CTBS

Executive Summary

The Kentucky Instructional Results System (KIRIS) was established in 1992 as the state's accountability system to measure progress toward the learning goals established under the Kentucky Education Reform Act (KERA). Criticism of KIRIS, however, became widespread and in 1996 the Task Force on Public Education recommended changes in Kentucky's assessment and accountability system. In 1998 the Commonwealth Accountability Testing System (CATS) replaced KIRIS. CATS includes both a norm-referenced test, the Comprehensive Test of Basic Skills (CTBS), and a criterion-referenced test, the Kentucky Core Content Test (KCCT).

During the first years following the introduction of this new accountability system, it is critical that information on its validity be gathered. One way to demonstrate evidence of validity is to show that the content areas assessed by KCCT correlate positively with like content areas on CTBS. The two measures have the following content areas (i.e., subjects) in common: Math, Reading, Science, and Social Studies. The observed relationships between these like subjects are expected to be in the "Goldilocks" range. As described by Hoffman (1998), correlations between two different but similar assessments should neither be exceptionally high, nor exceptionally low. Correlations should not be too low because the tests assess achievement in similar content areas. However, because the tests are based on different content standards, use differently formatted items, and were designed for different purposes, the correlations should not be too high. Hoffman referred to this "not-too-high-not-too-low" range as the "Goldilocks" criterion. The purpose of this report is to demonstrate that correlations between like subjects on KCCT and CTBS fall into the Goldilocks range.

Data for these analyses were provided by the Kentucky Department of Education (KDE). Separate KCCT data files were provided for Kentucky public school students in Grades 4, 5, 7, 8, 10, and 11 for 1999 through 2003. Separate CTBS data files were provided for Kentucky public school students in Grades 3, 6, and 9 for 2000 to 2003. In order to investigate whether the correlations between students' KCCT scores and CTBS scores are within the Goldilocks range, it was first necessary to merge the separate KCCT and CTBS data files. Since Kentucky students take KCCT and CTBS in different grades, the data files were merged across grades and across years. For example, the 2002 data file containing students' 3rd grade CTBS scores was merged with the 2003 data file containing their 4th grade KCCT scores. Students' KCCT and CTBS data were merged on their last name, first name, middle initial and date of birth. This process resulted in 11 files of merged data. An average of approximately 83% of the original cases was retained across the 11 merges. Students whose data merged scored somewhat higher on all CTBS and KCCT components than students whose data did not merge; however, the differences were not so large as to warrant concern that the unmatched sample differed dramatically from the matched sample.

Results

We expected stronger correlations between like subjects (e.g., KCCT Math & CTBS Math) than between different subjects (e.g., KCCT Science & CTBS Math). Tables 22 – 32 in

Appendix F present correlations among KCCT and CTBS for the 11 files of merged data. These tables include correlations among the content areas within KCCT and CTBS, as well as correlations between the two assessments. This allows for the examination of the following relationships:

- Like content area within different achievement measures, or convergent validity coefficients (Campbell & Fiske, 1959) (These correlations are in bold and are underlined).
- Different content areas within the same achievement measures (These correlations are in italics).
- Different content areas within different achievement measures, or discriminant validity coefficients (These correlations are in bold, but not underlined).

Interestingly, the highest correlations in the tables were not necessarily between different measures of like content as expected. Rather, the correlations between different subjects within the same measure (i.e., the *intercorrelations*) were similar, and in many cases slightly higher, than the convergent validity coefficients. For example, the like subject correlations range from r = .50 to r =.74, which is similar to the range of KCCT intercorrelations (r = .57 to r = .80) and to the range of CTBS intercorrelations[1] (r =.42 to r = .75). Lastly, as expected, the discriminant validity coefficients were the lowest of all and range from r = .35 to r = .68 (disregarding Total).

Analyses were also conducted to compare performance on KCCT with performance on CTBS for students from varying backgrounds. Three demographic variables were investigated: (1) gender, (2) socioeconomic status, and (3) ethnicity. Prior research has established that these demographic groups tend to vary in their average KCCT test performance (e.g., Bacci et al., 2003). The important question for investigating bias in Kentucky's KCCT scores is whether any differences between males and females, socioeconomic groups, or ethnic groups are larger than those observed in CTBS scores.

Descriptive statistics and effect size statistics were computed for the four content areas the two achievement measures have in common (i.e., Math, Social Studies, Reading, and Science). Effect sizes are a measure of the magnitude of the difference between two groups. Unlike significance tests, these indices are independent of sample size. Cohen (1988) defined effect sizes as "small, d = .2," medium, d = .5," and "large, d = .8." Effect size d statistics can be interpreted as the number of standard deviations difference in mean group scores.

Gender. For both CTBS and KCCT, the effect sizes reveal that there is virtually no substantive difference between males' and females' achievement scores on Math, Social Studies, and Science. These results suggest that there is no, or very little, differential impact for gender on these content areas for both CTBS and KCCT. However, the effect sizes for CTBS and KCCT reveal a small to medium effect favoring females on Reading. This finding is consistent with research demonstrating that females tend to obtain higher Reading scores than males (Willingham & Cole, 1997). Although the magnitudes of the effects for CTBS and KCCT are similar, KCCT effect sizes always favor females slightly more than the CTBS effect sizes. A regression analysis was used to further examine whether gender differences on KCCT are greater than gender differences on CTBS. With the possible exception of 7th grade Reading, the

[1] Disregarding Total, which is an average of Reading, Language, and Math

regression weights for gender are negligible and the changes in R^2s are virtually non-existent. These results indicate that observed gender differences on KCCT are no greater than observed gender differences on CTBS.

Socioeconomic Status. There are medium to strong effect sizes demonstrating that students with higher SES[2] perform better on both CTBS and KCCT than students with lower SES. This finding is consistent with results from the National Assessment of Educational Progress (NAEP) (U. S. Department of Education, 2004). The magnitudes of the effects remain relatively constant throughout elementary school (d = -.47 to d = -.61), middle school (d = -.61 to d = -.66), and high school (d = -.55 to d = -.67). To further explore whether KCCT scores demonstrate SES differences that are considerably different from SES differences in CTBS scores, a series of regression analyses were conducted. With the possible exception of 5th grade Social Studies, the regression weights for SES are negligible and the increases in R^2s are typically less than 1% for all grades and all subjects. Taken as a whole, these results indicate that KCCT has no more or no less differential impact in terms of SES than CTBS.

Ethnicity[3]. First, for African Americans and Whites there were medium to strong effect size differences on both CTBS (d = .56 to d = .83) and KCCT (d = .47 to d = .72), with Whites scoring higher than African Americans on all four content areas. These effect sizes are consistent with results from NAEP showing that Whites score higher on achievement measures than African Americans (U. S. Department of Education, 2004). Overall, the magnitudes of the effect size differences between African Americans and Whites are quite similar for CTBS and KCCT across grades. Nonetheless, with the exception of high school Social Studies, there is a consistent trend for the magnitude of the effect sizes to be smaller for KCCT than for CTBS. These findings suggest that KCCT has no more differential impact in regards to African American/White differences than CTBS, and may even have slightly less differential impact than CTBS. To further explore whether KCCT scores demonstrate smaller African American/White differences than CTBS scores, a series of regression analyses were conducted. In all cases, the regression weights for African American/White are trivial and the increases in R^2s are nearly zero. From a practical significance standpoint, this indicates that observed African American/White differences on KCCT are not significantly different than observed African American/White differences on CTBS.

Second, for Hispanics and Whites there were weak to medium effect size differences on both CTBS (d = .22 to d = .48) and KCCT (d = .27 to d = .43), with Whites scoring higher than Hispanics on all four content areas. Once again, this finding is consistent with results from NAEP (U. S. Department of Education, 2004). Overall, the effect size differences between Hispanics and Whites are in the same direction and are similar in magnitude for both CTBS and KCCT. Nevertheless, there is a consistent trend for CTBS to demonstrate smaller differences between Hispanics and Whites. To further explore whether KCCT scores demonstrate Hispanic/White differences that are unusually high compared to CTBS scores, a series of regression analyses were conducted. In all cases, the regression weights for Hispanic/White are virtually non-existent and the increases in the R^2s are practically zero. Consequently, these

[2] Lunch status was used as a proxy for SES.

[3] Only Whites, African Americans, and Hispanics were included in the analyses because there were very few Asian students and students marking the "Other" category.

results indicate that observed Hispanic/White differences on KCCT are not unusually high compared to observed Hispanic/White differences on CTBS.

Discussion and Conclusion

These results support the expectation that KCCT content area scale scores are positively correlated with like CTBS content area scale scores. The results indicate that students who do well on CTBS can also be expected to do well on KCCT, and vice versa. The correlations between the two tests are strong, but not so strong as to indicate that the two tests are interchangeable. Consistent with prior research, Math demonstrated the best convergent validity (Bacci et al., 2003). A possible explanation for Math's strong convergent validity is that Math may have the most easily identifiable content domain. In contrast, Social Studies demonstrated the weakest convergent validity. It may be that there are content coverage differences between the CTBS Social Studies test and the KCCT Social Studies test, more so than with the other content areas, such that correlations between the two are being depressed. Nonetheless, the convergent validity coefficients for Social Studies still fall within the Goldilocks range. Overall, these data provide strong evidence in support of KCCT as a valid measure of student achievement.

In addition to examining correlations between KCCT and CTBS, we also compared performance on the two measures for students from varying backgrounds. The important validity issue was whether any differences between males and females, socioeconomic groups, or ethnic groups were larger for KCCT than for CTBS. Gender does not appear to influence KCCT scores any more than would be expected based on observed differences in CTBS scores. The possible exception to this general conclusion is that middle school females appear to have slightly higher KCCT Reading scores than would be expected from their CTBS scores. Bacci et al. (2003) similarly found that females tended to do better on KCCT Reading than would be expected from their ACT Reading scores. This observed difference may be due to the finding that females do better on written tests (Bridgeman & Morgan, 1996), and KCCT requires more writing than either ACT or CTBS. In regards to socioeconomic status, there are medium-size effects favoring students with higher SES across nearly all content areas for both KCCT and CTBS, thereby indicating that KCCT has no more differential impact for students with lower SES than CTBS. Only 5th grade KCCT Social Studies demonstrated slightly more differential impact for students with lower SES. This observed difference could be due to content coverage differences. Finally, in regards to ethnicity, the effect size statistics indicate subtle differences between Whites and African Americans, and between Whites and Hispanics on both tests. Differences are in the same direction and of similar, but not identical, magnitude for both KCCT and CTBS. The results from the regression analyses indicate that ethnicity does not appear to influence KCCT scores any more than would be expected based on observed differences in CTBS scores. Overall, KCCT appears to have no more differential impact than CTBS in regards to gender, socioeconomic status or ethnicity. In sum, the results from this report provide strong validity evidence for KCCT.

Relationships Between Students' Scores on KCCT and CTBS

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RELATIONSHIPS BETWEEN STUDENTS' SCORES ON KCCT AND CTBS

Background and Introduction

In 1989, the Kentucky Supreme Court ruled that the Commonwealth's system of public schooling was unconstitutional. As a result, in 1990 the General Assembly enacted the Kentucky Education Reform Act (KERA). Through KERA, the General Assembly mandated the creation and implementation of a statewide performance-based student assessment program and school accountability system. The Kentucky Instructional Results Information System (KIRIS) was established in 1992 to measure progress toward the learning goals established under KERA. Criticism of KIRIS, however, became widespread and in 1996 the Task Force on Public Education recommended changes in Kentucky's assessment and accountability system. As a result, in 1998 the Commonwealth Accountability Testing System (CATS) replaced KIRIS.

Several changes were implemented during the transition from KIRIS to CATS. For example, multiple-choice components for each tested content area were added to the formula used to calculate school accountability indexes. The accountability indexes determine whether a school receives rewards, assistance, and/or additional scrutiny during its attempts to improve. Each school's index is related to an overall goal designed such that all schools will reach an accountability index of 100 of a possible 140 by 2014. KIRIS used only open-response components to determine school accountability indexes. Open-response components are given twice the weight of multiple-choice components in the CATS index calculation. The open-response components were included in the accountability system to ensure that Kentucky students are able to apply knowledge, rather than merely to recall disconnected facts.

CATS includes both a norm-referenced test and a criterion-referenced test. The Comprehensive Test of Basic Skills (CTBS) is a nationally norm-referenced test that assesses students exiting grades 3[4], 6, and 9 in: (1) Reading, (2) Reading Vocabulary, (3) Language, (4) Language Mechanics, (5) Math, (6) Math Computation, (7) Science, (8) Social Studies, and (9) Spelling. Although only the Reading, Math and Language assessments are part of the CATS accountability system, many schools and districts administer the other sections, as well. The Kentucky Core Content Test (KCCT) is a criterion-referenced test administered in Grades 4, 5, 7, 8, 10, and 11. The KCCT targets an achievement domain developed by Kentucky educators. It assesses students in Reading, Math, Science, Social Studies, Arts & Humanities, and Practical Living/Vocational Studies[5]. Table 1 below illustrates the grade in which each test and its corresponding section is administered (This table is replicated in Appendix A to provide a framework for examining the large number of tables included in this report).

[4] Students exiting Grade 3 also take a Word Analysis test.

[5] The writing portion of the KCCT is administered in Grades 4, 7, and 12, but is not investigated in this report.

Table 1. Content Areas Tested by CTBS and KCCT for Each Grade

Grade	Test	Content Area
3rd	CTBS	Reading Reading Vocabulary Language Language Mechanics Math Math Computation Science Social Studies Spelling Word Analysis
4th	KCCT	Reading Science
5th	KCCT	Math Social Studies Arts & Humanities Practical Living/Vocational Studies
6th	CTBS	Reading Reading Vocabulary Language Language Mechanics Math Math Computation Science Social Studies Spelling
7th	KCCT	Reading Science
8th	KCCT	Math Social Studies Arts & Humanities Practical Living/Vocational Studies
9th	CTBS	Reading Reading Vocabulary Language Language Mechanics Math Math Computation Science Social Studies Spelling
10th	KCCT	Reading Practical Living/Vocational Studies
11th	KCCT	Math Social Studies Science Arts & Humanities

Note. This table is replicated in Appendix A, Table 1.

During the first years following the introduction of this new accountability system, it is critical that information on the validity of KCCT exams be gathered. Bacci and colleagues investigated how KCCT scores related to other measures of educational achievement (Bacci, Koger, Hoffman, & Thacker, 2003). In particular, they examined relationships between students' scores on KCCT and their scores from the American College Test (ACT). They found that students with higher ACT scores tended to have higher scale scores on KCCT assessments. The relationships were not perfect (the correlations were around .60), but the trends were clear. The observed relationships between KCCT and ACT were in the expected "Goldilocks" range. As described by Hoffman (1998), correlations between two different but similar assessments should neither be exceptionally high, nor exceptionally low. Correlations should not be too low because the tests assess achievement in similar content areas. However, because the tests are based on different content standards, use differently formatted items, and were designed for different purposes, the correlations should not be too high. Hoffman referred to this "not-too-high-not-too-low" range as the "Goldilocks" criterion. Because the correlations between KCCT and ACT met this Goldilocks criterion, the researchers concluded that there was strong evidence of KCCT's validity as a measure of student achievement.

The purpose of this report is to extend Bacci et al.'s report by providing additional evidence for the validity of KCCT. This report investigates the relationship between KCCT and CTBS. In a 2003 mapping study conducted by CTB, 87% of CTB's TerraNova items were found to map to the Kentucky Core Content for Assessment standards (KDE, 1999) in Grades 3 and 6. Because there is overlap in the content areas being assessed, it is expected that the correlations between the two tests should be in the Goldilocks range.

Description of Data

KCCT Data

KCCT data were provided by the Kentucky Department of Education (KDE). Students' KCCT scores go through several transformations before they are reported. First, students' responses to each open-response item are categorized by trained scorers into one of five raw score categories which are assigned numerical values from 0 to 4. Correct multiple-choice responses receive 1 point. Points are then summed in order to calculate a raw score. Open-response and multiple-choice raw scores are then converted into an equated scale score, which can range from 325 to 800. In the scaling process, the open-response components are weighted so that they count twice as much as multiple-choice components (KDE, 2002). Separate data files were provided for Kentucky public school students in Grades 4, 5, 7, 8, 10, and 11 for 1999 through 2003. The data files consisted of a background data file (which included last names, first names, middle initials, and birth dates), and a scale score file. The background data file and the scale score file were linked via a common test form identification number for each year and grade. Tables containing the descriptive statistics for KCCT data from 1999 through 2003 are presented in Appendix B. Table 2 below provides an example of the tables in Appendix B.

Table 2. KCCT Descriptive Statistics by Grade and Content Area for 1999 —Total Sample

		RD	SC	MA	SS	AH	PL
Grade 4	*M*	540.82	534.45	--	--	--	--
	SD	47.33	44.34	--	--	--	--
	N	49,101	49,101	--	--	--	--
Grade 5	*M*	--	--	548.46	533.33	499.57	498.68
	SD	--	--	49.14	42.70	71.06	70.92
	N	--	--	46,930	46,930	46,930	46,930
Grade 7	*M*	507.48	494.55	--	--	--	--
	SD	42.30	39.18	--	--	--	--
	N	48,457	48,457	--	--	--	--
Grade 8	*M*	--	--	519.90	500.02	497.62	497.78
	SD	--	--	51.53	50.70	67.87	68.66
	N	--	--	49,413	49,413	49,413	49,413
Grade 10	*M*	494.05	--	--	--	--	497.68
	SD	59.96	--	--	--	--	68.67
	N	46184	--	--	--	--	46184
Grade 11	*M*	--	531.99	519.41	534.30	496.53	--
	SD	--	51.32	60.51	61.99	68.09	--
	N	--	41,087	41,087	41,087	41,087	--

Note. *M* = Mean; *SD* = Standard Deviation; *N* = Sample Size.
This table is replicated in Appendix B, Table 2.

CTBS Data

The CTBS data were also provided by KDE. The scale score is the basic score for CTBS. Scale scores are units of a single, equal-interval scale and are expressed in numbers that range from 0 to 999 (CTB/McGraw-Hill, 1997). CTBS data consisted of data files for Kentucky public school students in Grades 3, 6, and 9 for 2000 to 2003. Both background information and scale score information were contained within the same data file; consequently, no linking was necessary for the CTBS data files. The descriptive statistics for CTBS data from 2001 through 2003 are presented in Appendix C. Table 3 below provides an example of those tables.

Table 3. CTBS Descriptive Statistics by Grade and Content Area for 2003 —Total Sample

		Reading	Reading Vocab.	Language	Lang. Mechanics	Math	Math Computation	Total Score	Science	Social Studies	Spelling	Word Analysis
Grade 3	*M*	642.07	632.83	638.19	630.71	621.46	595.33	633.92	633.72	640.64	612.98	643.59
	SD	42.80	43.46	39.29	38.38	43.13	41.60	37.15	48.96	42.25	54.95	43.38
	N	48,007	26,922	48,002	26,918	47,999	26,797	47,991	28,944	28,930	26,911	26,924
Grade 6	*M*	664.81	657.45	661.11	657.53	665.53	653.62	663.84	670.27	666.35	656.98	--
	SD	41.30	42.35	43.49	42.43	49.43	46.19	39.87	45.55	40.17	45.58	--
	N	50,662	31,402	50,661	31,072	50,645	31,195	50,625	32,976	32,966	31,068	--
Grade 9	*M*	686.21	679.36	678.30	679.03	699.81	690.69	688.19	28,750	684.52	688.00	--
	SD	39.58	41.68	46.35	46.07	53.24	52.54	41.16	698.21	37.41	50.31	--
	N	50,102	27,003	50,101	26,295	50,041	26,516	49,995	47.35	28,682	26,273	--

Note. This table is replicated in Appendix C, Table 9.

Merging

KCCT and CTBS

In order to investigate whether the correlations between students' KCCT scores and CTBS scores are within the Goldilocks range, it was first necessary to merge the separate KCCT and CTBS data files. Since Kentucky students take KCCT and CTBS in different grades, the data files were merged across grades and across years. For example, the 2002 data file containing students' 3rd grade CTBS scores was merged with the 2003 data file containing their 4th grade KCCT scores.

The data from the two tests were merged for each student. Appendix D displays the 11 merge combinations along with the number and percentage of students whose data successfully merged. Four merge attempts were made within each of the 11 merges. The first merge attempt was made on exact matches of last name, first name, date of birth and middle initial. The second merge attempt was made using last name, first name and date of birth. The third merge attempt was made using last name, first name truncated to the first four letters, and date of birth. The fourth merge attempt was made using the last name truncated to the first four letters, the first name truncated to the first four letters, and the date of birth. After each merge attempt, three files were created: (1) successfully merged student data, (2) unmerged students from File 1, and (3) unmerged students from File 2. Each successive merge attempt was made using only the unmerged student files. The four successfully merged student data files were then combined. An average of approximately 83% of the original cases was retained for the 11 merges. Merges between consecutive years (e.g., 2001 – 2002) tended to have a greater percentage of successful matches than merges between nonconsecutive years (e.g., 2001 – 2003). The merging of files may have been affected by student transience and by inconsistent reporting of students' names across years. For example, a student reporting his name as 'Thomas' one year might report his name as 'Tom' during another year, and the two first names, even when truncated, would not match. Student errors and inconsistencies when coding their birthdates may also have caused a portion of students' files not to merge.

An additional analysis was conducted to verify that students retained in the final data set did not differ meaningfully on CTBS and KCCT scores from those whose data failed to merge. The tables in Appendix E present the descriptive statistics for matched (i.e., merged) students compared with unmatched (i.e., unmerged) students. Table 4 below provides an example of the tables appearing in Appendix E. Students whose data merged scored somewhat higher on all CTBS and KCCT components than students whose data did not merge. For example, in Table 4 the mean difference between CTBS matched and CTBS unmatched scores is 15.85. The mean difference between KCCT matched and KCCT unmatched scores is 19.35. For both CTBS and KCCT, the difference between matched and unmatched scale score means was typically less than one half standard deviation, with matched students always scoring higher. These findings are consistent with research of this type (Bacci et al., 2003; Thacker & Hoffman, 1999), and while the differences are consistent, they are not so large as to warrant concern that the unmatched sample differs dramatically from the matched sample. Finally, notice that the sample sizes for CTBS vary across content areas, whereas the sample sizes for KCCT remain the same across content areas. This is because KCCT tests are administered within the same testing window, and

schools go to great lengths to ensure that students complete each section. On the other hand, sections of CTBS may not be administered within the same testing window, and, with the exceptions of Math, Reading and Language, are not administered in all schools.

Table 4. Descriptive Statistics for 2001 CTBS Grade 3 and 2002 KCCT Grade 4

	Matched			Unmatched			Mean
2001 CTBS Grade 3	*M*	*SD*	*N*	*M*	*SD*	*N*	Difference
Reading	639.87	42.08	42,093	624.52	45.53	7,586	15.35
Reading Vocabulary	628.23	43.21	23,942	611.67	47.69	4,015	16.56
Language	635.87	38.92	42,088	621.06	40.32	7,584	14.81
Language Mechanics	628.18	37.89	23,950	613.63	40.21	4,017	14.55
Math	617.69	42.18	42,082	600.93	45.14	7,583	16.76
Math Computation	591.02	41.21	23,941	575.41	48.48	4,016	15.61
Total	631.16	36.60	42,073	615.54	39.57	7,578	15.62
Science	626.62	47.27	24,254	611.06	51.58	4,089	15.56
Social Studies	637.36	41.41	24,162	622.60	43.19	4,077	14.76
Spelling	609.11	54.95	23,929	588.67	59.60	4,013	20.44
Word Analysis	638.37	42.63	23,858	624.01	45.71	4,002	14.36
2002 KCCT Grade 4							
Reading	547.40	39.88	42,450	527.21	63.59	7,313	20.19
Science	544.90	37.03	42,450	526.40	62.51	7,313	18.50

Note. This table is replicated in Appendix E, Table 11.

Correlations Analyses[6]

The purpose of this investigation is to provide additional evidence for the validity of KCCT by establishing that like content areas on KCCT and CTBS correlate within the Goldilocks range. We expect stronger correlations between like subjects (e.g., KCCT Math & CTBS Math) than between different subjects (e.g., KCCT Science & CTBS Math). The tables in Appendix F present correlations among KCCT and CTBS for the 11 files of merged data. Table 5 below is a representative example of the tables in Appendix F. These tables include correlations among the content areas within KCCT and CTBS, as well as correlations between the two assessments. This allows for the examination of the following relationships:

- The like content area within different achievement measures, or convergent validity coefficients (Campbell & Fiske, 1959) (These correlations are in bold and are underlined).
- Different content areas within the same achievement measures (These correlations are in italics).
- Different content areas within different achievement measures, or discriminant validity coefficients (These correlations are in bold, but not underlined).

[6] Given the extremely large sample sizes used in this report, tests of statistical significance are irrelevant. All reported relationships are statistically significant; that is, unlikely to be due to chance. Therefore, the report focuses on interpretation of the results.

In correlation tables of this type, the expectation is for the highest correlations to be between different measures of like content (i.e., convergent validity). Then, because of similarities in test-taking strategies or other method effects, the next highest correlations are typically those between different content areas, but measured by the same method of assessment. Correlations between different content areas with different measures should be the lowest in the tables (i.e., discriminant validity).

Interestingly, the highest correlations in the tables are not necessarily between different measures of like content as expected. Rather, the correlations between different subjects within the same measure (i.e., the *intercorrelations*) are similar, and in many cases slightly higher, than the convergent validity coefficients. For example, the like subject correlations range from r = .50 to r =.74, which is similar to the range of KCCT intercorrelations (r = .57 to r = .80) and the range of CTBS intercorrelations[7] (r =.42 to r = .75). Lastly, as expected, the discriminant validity coefficients are the lowest of all and range from r = .35 to r = .68 (disregarding Total).

[7] Disregarding Total, which is an average of Reading, Language, and Math

Table 5. Correlations Between KCCT 2003 8th Graders and CTBS 2001 6th Graders

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
KCCT Grade 8														
1. Math	1.00													
2. Social Studies	*.77*	1.00												
3. Arts & Humanities	*.64*	*.72*	1.00											
4. Practical Living	*.66*	*.72*	*.65*	1.00										
CTBS Grade 6														
5. Reading	**.61**	**.65**	**.56**	**.57**	1.00									
6. Reading Vocabulary	**.60**	**.65**	**.56**	**.60**	*.73*	1.00								
7. Language	**.59**	**.63**	**.55**	**.55**	*.75*	*.70*	1.00							
8. Language Mechanics	**.61**	**.59**	**.55**	**.53**	*.62*	*.62*	*.65*	1.00						
9. Math	**.70**	**.63**	**.55**	**.55**	*.68*	*.66*	*.67*	*.66*	1.00					
10. Math Computation	**.60**	**.54**	**.48**	**.47**	*.55*	*.52*	*.56*	*.62*	*.68*	1.00				
11. Total	**.71**	**.71**	**.62**	**.62**	*.90*	*.78*	*.90*	*.72*	*.90*	*.67*	1.00			
12. Science	**.60**	**.61**	**.51**	**.53**	*.69*	*.70*	*.64*	*.55*	*.66*	*.51*	*.74*	1.00		
13. Social Studies	**.62**	**.64**	**.55**	**.55**	*.72*	*.72*	*.69*	*.62*	*.68*	*.56*	*.78*	*.72*	1.00	
14. Spelling	**.48**	**.51**	**.46**	**.45**	*.55*	*.57*	*.58*	*.60*	*.54*	*.49*	*.62*	*.48*	*.53*	1.00

Note. This table is replicated in Appendix F, Table 26.

In relation to KCCT intercorrelations, the subjects correlated with Arts & Humanities and with Practical Living/Vocational Studies tended to have the lowest correlations. For example, the intercorrelations between Reading and Science (r =.79 to r = .80) are higher than the intercorrelations between Arts & Humanities and Science (r = .67), and between Practical Living and Reading (r = .70 to r = .73). Bacci et al. (2003) similarly found that subjects correlated with Arts & Humanities and Practical Living/Vocational Studies tended to be lower. The Arts & Humanities and Practical Living tests each only have 10 items that count toward scale scores, whereas all other KCCT content areas have 30 items. Two separate tests cannot correlate perfectly because the relationship is affected by error variance. Error variance is often represented by Cronbach's alpha (i.e., internal consistency). This statistic is affected to a large extent by the number of items on the test. Consequently, simply by virtue of Arts & Humanities and Practical Living/Vocational Studies tests having fewer items, we would expect these subject tests to have lower correlations with other KCCT subject tests and with CTBS tests. Nonetheless, despite the fewer number of items on the Arts & Humanities test and the Practical Living/Vocational Studies test, their correlations are still within the Goldilocks range.

In relation to the CTBS intercorrelations, the pattern of correlations supports common expectations that the Reading test should be reasonably well correlated with its supplemental Reading Vocabulary test (r = .69 to r = .73); the Language test with its supplemental Language Mechanics test (r = .64 to r = .66); and the Math test with its supplemental Math Computation test (r = .64 to r = .74). Moreover, intercorrelations among the core subject areas (i.e., Reading, Math, Language, Science, and Social Studies) all tend to be between .60 and .75. The correlations between Reading and Language tend to be at the higher end of this range, while Science and Social Studies correlations with Language and Math tend to be somewhat lower. The lowest correlations occur between Spelling, generally not considered to be a "core" subject, and the other tests (r = .42 to r = .62).

In relation to the convergent validity coefficients, CTBS and KCCT have the following content areas in common: Math, Reading, Science and Social Studies. Consequently, these are the four content areas for which convergent validity coefficients are available. The convergent validity coefficients for Math are highest (r = .63 to r = .74), followed by Reading (r = .59 to r = .71), Science (r = .55 to r = .66), and Social Studies (r = .50 to r = .64). Interestingly, Social Studies' discriminant validity coefficients with Reading (r = .57 to r = .68), Language (r = .55 to r = .63) and Math (r = .55 to r = .65) tended to be higher than its convergent validity coefficients. It may be that there are content coverage differences between the CTBS Social Studies test and the KCCT Social Studies test, more so than with the other content areas, such that correlations between the two are being depressed. The finding that Math demonstrated the best convergent validity is consistent with prior research (Bacci et al., 2003). All in all, these convergent validity coefficients satisfy the Goldilocks criterion of being in the "not-too-high-not-too-low" range, and thereby provide additional evidence for the validity of KCCT.

Demographic Analyses

Analyses were conducted to compare performance on KCCT with performance on CTBS for students from varying backgrounds. In particular, three demographic variables were investigated: (1) gender, (2) socioeconomic status, and (3) ethnicity. Prior research has

established that these demographic groups tend to vary in their average test performance (e.g., Bacci et al., 2003). The important question for judging bias in Kentucky's KCCT scores is whether any differences between males and females, socioeconomic groups, or ethnic groups are larger than those observed in CTBS scores.

Recall that with the available KCCT and CTBS data provided by KDE, 11 files of merged data were created. Of those 11 files, several contained duplicate grade combinations. For example, one merge consisted of 2000 CTBS 3rd grade with 2002 KCCT 5th grade, and another merge consisted of the same grade combination but for 2001 and 2003. In cases such as this, we computed the descriptive statistics for only the most recent file. This resulted in six CTBS/KCCT files being included in this section of the analyses. A list of these files is presented in Appendix G, Table 33. Descriptive statistics were computed on the four content areas the two achievement measures have in common (i.e., Math, Social Studies, Reading, and Science). The effect sizes are included in these tables. Effect sizes are a measure of the magnitude of the difference between two groups. Unlike significance tests, these indices are independent of sample size. While there is a wide array of formulas used to measure effect sizes, Cohen's *d* (1988) is among the more popular and is simply a measure of the difference between two means divided by their pooled standard deviation. Cohen defined effect sizes as "small, $d = .2$," medium, $d = .5$," and "large, $d = .8$." Cohen's *d* can be interpreted as the number of standard deviations difference between the means of the two groups.

Gender. Tables 6 and 7 below display the descriptive statistics for males and females for CTBS and KCCT, respectively. Students were identified as male or female based on the demographic information in the KCCT file. For both CTBS and KCCT, the effect sizes reveal that there is virtually no substantive difference between males' and females' achievement scores on Math, Social Studies, and Science. These results suggest that there is no, or very little, differential impact for gender on these content areas for both CTBS and KCCT. However, the effect sizes for CTBS and KCCT reveal a small to medium effect favoring females on Reading. This finding is consistent with well established research demonstrating that females obtain higher Reading scores than males (Willingham & Cole, 1997). Females' mean Reading scores are higher than males' mean Reading scores, particularly in the higher level grades. For instance, at the elementary school level the effect size for 2002 3rd grade CTBS Reading is $d = -.13$, and in 4th grade the magnitude of the effect is $d = -.28$ for KCCT Reading. At the middle school level, the effect for 2002 6th grade CTBS Reading is $d = -.19$, and in 7th grade the magnitude of the effect is $d = -.43$ for KCCT Reading. Finally, at the high school level, the effect size for 2002 9th grade CTBS Reading is $d = -.37$, and in 10th grade the magnitude of the effect is $d = -.44$ for KCCT Reading. Although the magnitudes of the effects for CTBS and KCCT are similar, across all content areas the effect sizes for KCCT always favor women slightly more than the effect sizes for CTBS.

Table 6. CTBS Descriptive Statistics by Gender

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2001 3rd	Male	617.63	43.30	19,954	-.04	636.97	42.20	11,542	-.04								
	Female	619.17	40.73	19,431		638.68	40.54	11,121									
2001 6th	Male	664.70	51.27	19,214	-.07	666.40	42.21	12,497	-.04								
	Female	667.94	45.71	19,649		667.97	36.71	12,752									
2001 9th	Male	711.34	51.93	16,216	.11	692.77	40.36	8,198	.08								
	Female	705.68	47.24	17,129		689.80	30.12	8,648									
2002 3rd	Male									639.20	42.76	20,516	-.13	632.65	49.45	12,289	.13
	Female									644.62	41.36	19,986		626.35	44.44	11,944	
2002 6th	Male									662.02	42.18	21,081	-.19	674.01	47.29	14,265	.12
	Female									669.59	38.80	20,867		668.53	41.68	14,088	
2002 9th	Male									684.11	37.31	18,693	-.37				
	Female									697.52	35.84	19,243					

Note. *M* = Mean; *SD* = Standard Deviation; *N* = Sample Size; *ES* = Effect Size.
This table is replicated in Appendix H, Table 34.

Table 7. KCCT Descriptive Statistics by Gender

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2003 4th	Male									543.20	40.07	20,715	-.28	548.74	37.77	20,715	-.01
	Female									554.29	39.01	20,138		549.28	34.71	20,138	
2003 5th	Male	561.39	50.04	20,136	-.06	541.07	39.36	20,136	-.09								
	Female	564.40	47.23	19,563		544.83	39.94	19,563									
2003 7th	Male									507.10	37.34	21,336	-.43	502.74	38.24	21,336	-.03
	Female									522.86	35.77	21,054		503.67	34.82	21,054	
2003 8th	Male	533.61	46.23	19,437	-.09	512.52	49.12	19,437	-.21								
	Female	537.43	41.76	19,817		523.09	49.62	19,817									
2003 10th	Male									498.12	58.72	18,979	-.44				
	Female									523.23	55.50	19,482					
2003 11th	Male	535.22	55.62	16,439	-.05	543.86	63.95	16,439	-.13								
	Female	537.89	49.36	17,302		551.98	61.06	17,302									

Note. This table is replicated in Appendix H, Table 35.

Given that the magnitudes of the effects were somewhat larger for KCCT than for CTBS, a regression analysis was used to further examine whether gender differences on KCCT are greater than gender differences on CTBS. For each of the four content areas, a regression equation was calculated predicting KCCT scores from the matching CTBS content score. Then, a second equation was created which added gender. If KCCT scores are exhibiting greater gender differences than are CTBS scores, then gender will have a significant regression weight and there will be a meaningful increase in the prediction (i.e., amount of variance explained) in KCCT scores. The regression tables for gender are presented in Appendix I. Table 36 presents the regression equations for grades at the elementary school level; Table 37 presents the regression equations for middle school, and Table 38 presents the regression equations for high school. Table 8 below is replicated below to provide an example. With the possible exception of 7th grade Reading, the regression weights for gender are negligible and the changes in R^2s are virtually non-existent across all grades and years. For 7th grade Reading, gender has a noticeable weight ($ß$ = .17), and the prediction of KCCT Reading is increased slightly by 3%. Gender is coded such that the positive regression weight indicates that females tend to have higher reading scores than would be expected from gender differences in CTBS Reading alone. This analysis does not necessarily mean that males are unfairly discriminated against by the KCCT assessment. It does mean that compared to their female counterparts, they do not do as well on KCCT Reading as might be predicted from their CTBS scores. However, this effect is small and is only evident in middle school Reading. In all the cases, these results indicate that observed gender differences on KCCT are no greater than observed gender differences on CTBS.

Table 8. Regression Results Showing Gender Effects in Middle School

	2003 KCCT 8th Grade											
	Math			Social Studies			Reading			Science		
Predictors:	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2
2001 CTBS 6th												
Step 1: Math	.70	.49										
Step 2: Gender	.02	.49	.00									
2001 CTBS 6th												
Step 1: Social Studies				.64	.41							
Step 2: Gender				.09	.42	.01						
	2003 KCCT 7th Grade											
2002 CTBS 6th												
Step 1: Reading							.64	.41				
Step 2: Gender							.17	.44	.03			
2002 CTBS 6th												
Step 1: Science										.66	.43	
Step 2: Gender										.05	.43	.00

Note. This table is replicated in Appendix I, Table 37.

Socioeconomic Status. Students' socioeconomic status (SES) was defined in terms of whether or not the students received free or reduced priced school lunches. This is a commonly used proxy for SES in educational research (e.g., Okpala, Okpala, & Smith, 2001). Students who received free or reduced school lunches were coded as having lower SES, and students not receiving free or reduced lunches were coded as having higher SES. Students' SES was identified based on demographic information in the KCCT file. Appendix J displays the SES descriptive statistics for CTBS and KCCT. Those tables are also reproduced below in Tables 9 and 10. There are medium to strong effect sizes demonstrating that students with higher SES perform better on both CTBS and KCCT than students with lower SES. This finding is consistent with results from the National Assessment of Educational Progress (NAEP) (U. S. Department of Education, 2004). A comparison of the two tables reveals that SES has a medium to strong effect on students' scores on Math, Social Studies, Reading and Science for both CTBS (d = -.52 to d = -.65) and KCCT (d = -.47 to d = -.67). Moreover, the magnitude of the effects are relatively constant throughout elementary school (d = -.47 to d = -.61), middle school (d = -.61 to d = -.66), and high school (d = -.55 to d = -.67). Because the effect sizes for KCCT are similar to the effect sizes for CTBS this provides evidence that KCCT has no more and no less differential impact with regards to SES than CTBS.

Table 9. CTBS Descriptive Statistics by SES

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2001 3rd	Lower	606.29	39.89	19,543	-.58	626.86	38.65	11,106	-.52								
	Higher	629.75	40.85	11,912		647.71	41.09	7,186									
2001 6th	Lower	649.23	47.08	16,694	-.62	653.05	37.18	10,874	-.62								
	Higher	677.75	45.49	10,601		676.05	37.38	6,906									
2001 9th	Lower	686.36	47.74	9,717	-.61	677.14	33.45	4,940	-.55								
	Higher	715.05	46.78	10,420		696.01	34.90	4,778									
2002 3rd	Lower									630.75	40.16	20,368	-.56	617.20	45.12	11,928	-.54
	Higher									653.51	41.26	13,005		641.76	46.58	8,348	
2002 6th	Lower									652.14	38.38	18,739	-.63	656.09	41.16	12,547	-.65
	Higher									676.79	39.49	10,883		683.55	42.98	7,628	
2002 9th	Lower									677.02	36.90	12,898	-.57				
	Higher									698.23	37.61	24,660					

Note. This table is replicated in Appendix J, Table 39.

Table 10. KCCT Descriptive Statistics by SES

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2003 4th	Lower									539.38	38.74	20,569	-.50	541.11	35.71	20,569	-.47
	Higher									558.58	37.39	13,081		557.48	33.24	13,081	
2003 5th	Lower	549.48	45.94	19,724	-.59	532.04	37.77	19,724	-.61								
	Higher	576.49	46.12	11,977		554.66	36.89	11,977									
2003 7th	Lower									503.54	36.53	18,999	-.61	491.84	36.44	18,999	-.61
	Higher									524.98	34.18	10,947		512.86	32.57	10,947	
2003 8th	Lower	520.51	45.05	16,946	-.61	500.05	46.84	16,946	-.66								
	Higher	545.83	38.37	10,670		530.63	46.45	10,670									
2003 10th	Lower									487.75	55.93	13,187	-.67				
	Higher									525.00	55.07	11,866					
2003 11th	Lower	515.22	54.17	9,924	-.55	523.02	60.10	9,924	-.57								
	Higher	543.39	48.77	10,497		557.58	61.00	10,497									

Note. This table is replicated in Appendix J, Table 40.

To further explore whether KCCT scores demonstrate SES differences that are considerably different from SES differences in CTBS scores, a series of regression analyses were conducted. In the first step, the CTBS performance measure in question was used to predict the corresponding KCCT performance measure. Then, in the second step SES was entered. If KCCT scores are exhibiting SES differences that are significantly different from CTBS scores, then SES will have a significant regression weight and there will be a meaningful increase in the prediction of KCCT scores. The regression tables for SES are presented in Appendix K. With the possible exception of 5th grade Social Studies, the regression weights for SES are negligible and the increases in R^2s are typically less than 1% for all grades and all subjects. For 5th grade Social Studies (replicated in Table 11 below), SES has a noticeable weight ($ß = .17$), and the prediction of KCCT Social Studies is improved by 3%. SES is coded such that the positive regression weight indicates that students with higher SES tend to have higher Social Studies scores than would be expected from SES differences in CTBS Social Studies alone. However, this effect is small and is only evident in the 5th grade. Taken as a whole, the results from the regression analysis indicate that KCCT has no more or no less differential impact in terms of SES than CTBS.

Table 11. Regression Results Showing SES Effects in Elementary School

Predictors:	Math ß	Math R^2	Math ?R^2	Social Studies ß	Social Studies R^2	Social Studies ?R^2	Reading ß	Reading R^2	Reading ?R^2	Science ß	Science R^2	Science ?R^2
2003 KCCT 5th Grade												
2001 CTBS 3rd												
Step 1: Math	.63	.40										
Step 2: SES	.12	.41	.01									
2001 CTBS 3rd												
Step 1: Social Studies				.51	.26							
Step 2: SES				.17	.29	.03						
2003 KCCT 4th Grade												
2002 CTBS 3rd												
Step 1: Reading							.60	.36				
Step 2: SES							.11	.37	.01			
2002 CTBS 3rd												
Step 1: Science										.55	.31	
Step 2: SES										.11	.32	.01

Note. This table is replicated in Appendix K, Table 41.

Ethnicity. Appendix L displays the descriptive statistics for CTBS and KCCT broken down by ethnicity. Those tables are replicated below as Tables 12 and 13. Students were identified as White, African American or Hispanic based on the demographic information in their KCCT file. In these tables, African Americans and Hispanics are compared to Whites. Consequently, the effect size statistic in the box aligned with "African American" reflects the magnitude of the effect between African Americans and Whites, and the effect size statistic in the box aligned with "Hispanic" reflects the magnitude of the effect between Hispanics and Whites.

Table 12. CTBS Descriptive Statistics by Ethnicity

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2001 3rd	White	621.31	41.60	33,644		640.35	41.43	19,726									
	A.A.	596.80	39.25	4,600	.61	616.70	34.58	2,247	.62								
	Hispanic	612.27	38.48	357	.22	629.79	42.02	214	.25								
2001 6th	White	670.31	47.13	33,656		670.89	38.55	21,482									
	A.A.	634.07	47.86	4,118	.76	640.89	36.68	3,041	.79								
	Hispanic	657.25	43.13	321	.29	658.50	33.18	211	.34								
2001 9th	White	711.28	48.60	29,438		692.82	35.23	14,892									
	A.A.	678.45	46.75	2,989	.69	674.12	31.29	1,456	.56								
	Hispanic	699.34	52.71	252	.24	684.44	36.73	137	.23								
2002 3rd	White									644.83	41.82	34,915		632.42	46.51	21,607	
	A.A.									621.67	39.54	4,515	.57	601.17	44.18	2,056	.69
	Hispanic									625.29	39.63	417	.48	616.85	50.35	239	.32
2002 6th	White									668.98	40.14	36,294		675.53	43.47	24,262	
	A.A.									641.08	36.88	4,503	.72	640.44	41.17	3,286	.83
	Hispanic									658.77	36.21	369	.27	665.23	39.43	246	.25
2002 9th	White									692.96	36.49	33,269					
	A.A.									671.40	36.91	3,625	.59				
	Hispanic									683.96	37.41	279	.24				

Note. A.A. = African American

This table is replicated in Appendix L, Table 44.

Table 13. KCCT Descriptive Statistics by Ethnicity

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2003 4th	White									551.01	39.31	35,131		551.49	35.50	35,131	
	A.A.									532.68	38.36	4,543	.47	532.21	34.55	4,543	.55
	Hispanic									531.58	55.87	488	.40	532.10	53.68	488	.43
2003 5th	White	565.82	48.04	33,843		545.49	39.17	33,843									
	A.A.	540.75	46.29	4,629	.53	524.43	37.89	4,629	.55								
	Hispanic	552.02	53.36	408	.27	532.13	44.82	408	.32								
2003 7th	White									517.38	36.25	36,550		506.33	34.76	36,550	
	A.A.									496.08	39.34	4,568	.56	479.43	40.01	4,568	.72
	Hispanic									499.44	53.92	446	.39	487.54	51.89	446	.43
2003 8th	White	538.99	41.87	33,893		521.50	48.32	33,893									
	A.A.	507.65	49.90	4,173	.68	488.69	49.00	4,173	.68								
	Hispanic	523.95	47.35	382	.34	503.68	52.58	382	.36								
2003 10th	White									513.92	57.42	33,613					
	A.A.									482.65	58.05	3,698	.54				
	Hispanic									490.42	63.49	354	.38				
2003 11th	White	517.38	36.25	36,550		506.33	34.76	36,550									
	A.A.	496.08	39.34	4,568	.56	479.43	40.01	4,568	.72								
	Hispanic	499.44	53.92	446	.39	487.54	51.89	446	.43								

Note. This table is replicated in Appendix L, Table 45.

First, for African Americans and Whites there were medium to strong effect size differences on both CTBS (d = .56 to d = .83) and KCCT (d = .47 to d = .72), with Whites scoring higher than African Americans on all four content areas. These effect sizes are consistent with results from NAEP showing that Whites score higher on achievement measures than African Americans (U. S. Department of Education, 2004). For the elementary school grades, the magnitudes of the effects were smaller, on average, by approximately .10 for KCCT Math, Social Studies, Reading and Science than for CTBS Math, Social Studies, Reading and Science. Similarly, for the middle school grades, the magnitudes of the effects for KCCT were smaller than the magnitudes of the effects for CTBS across content areas by approximately .10. Finally, for the high school grades, the magnitude of the effect was smaller by .13 for KCCT Math than for CTBS Math, and by .04 from KCCT Reading than for CTBS Reading. High school Social Studies is the only subject for which the effect size was larger for KCCT (d = .72) than for CTBS (d = .56). Overall, the magnitudes of the effect size differences between African Americans and Whites are quite similar for CTBS and KCCT across grades. Nonetheless, with the exception of high school Social Studies, there is a consistent trend for the magnitude of the effect sizes to be smaller for KCCT than for CTBS. These findings suggest that KCCT has no more differential impact for African American students than CTBS, and may even have somewhat less differential impact than CTBS.

To further explore whether KCCT scores demonstrate smaller African American/White differences than CTBS scores, a series of regression analyses were conducted. In the first set of regression analyses, the CTBS performance measure in question was used to predict the corresponding KCCT performance measure. Then, the ethnicity variable, dichotomously coded for African American and White, was entered. If KCCT scores are exhibiting African American/White differences that are significantly different from CTBS scores, then ethnicity will have a significant regression weight and there will be a meaningful increase in the prediction of KCCT scores. The regression tables are presented in Appendix M, and Table 14 is replicated below as an example. In all cases, the regression weights for African American/White are trivial and the increases in R^2s are nearly zero. From a practical significance standpoint, this indicates that observed African American/White differences on KCCT are not significantly different than observed African American/White differences on CTBS.

Table 14. Regression Results Showing Ethnicity Effects (African American/White) in High School

	2003 KCCT 11th Grade								
	Math			Social Studies			Reading		
Predictors:	ß	R^2	$?R^2$	ß	R^2	$?R^2$	ß	R^2	$?R^2$
2001 CTBS 9th									
Step 1: Math	.74	.55							
Step 2: AA/W	-.05	.55	.00						
2001 CTBS 9th									
Step 1: Social Studies				.63	.39				
Step 2: AA/W				-.04	.40	.00			
	2003 KCCT 10th Grade								
2002 CTBS 9th									
Step 1: Reading							.70	.49	
Step 2: AA/W							-.04	.49	.00

Note. This table is replicated in Appendix M, Table 48.

Second, for Hispanics and Whites there were weak to medium effect size differences on both CTBS (d = .22 to d = .48) and KCCT (d = .27 to d = .43), with Whites scoring higher than Hispanics on all four content areas. Once again, this is consistent with results from NAEP (U. S. Department of Education, 2004). Even though the range in effect sizes for CTBS and KCCT are similar, it is interesting to note that in all cases but one (3rd grade Reading), KCCT demonstrates larger effect sizes than CTBS. The largest difference is for high school Social Studies for which CTBS has an effect size of d = .23, and KCCT has an effect size of d = .43. Interestingly, the smallest difference is for middle school Social Studies for which CTBS has an effect size of d = .34, and KCCT has an effect size of d = .36. Overall, the effect size differences between Hispanics and Whites are in the same direction and are similar in magnitude for both CTBS and KCCT. Nevertheless, there is a consistent trend for CTBS to demonstrate smaller differences between Hispanics and Whites.

To further explore whether KCCT scores demonstrate Hispanic/White differences that are unusually high compared to CTBS scores, a series of regression analyses were conducted. A dichotomously coded variable for Hispanic/White was entered into the regression equation in the same manner as above. If KCCT scores are exhibiting greater differences between Hispanics and Whites than CTBS scores, then this variable will have a significant regression weight and there will be a meaningful increase in the prediction of KCCT scores. These regression tables are presented in Appendix N. Table 15 below provides an example of the Tables in Appendix N. In all cases, the regression weights for Hispanic/White are virtually non-existent and the increases in the R^2s are practically zero. Consequently, these results indicate that observed Hispanic/White differences on KCCT are not unusually high compared to observed Hispanic/White differences on CTBS.

Table 15. Regression Results Showing Ethnicity Effects (Hispanic/White) in Elementary School

	2003 KCCT 5th Grade											
	Math			Social Studies			Reading			Science		
Predictors:	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2
2001 CTBS 3rd												
Step 1: Math	.63	.40										
Step 2: H/W	.00	.40	.00									
2001 CTBS 3rd												
Step 1: Social Studies				.50	.25							
Step 2: H/W				.00	.25	.00						
	2003 KCCT 4th Grade											
2002 CTBS 3rd												
Step 1: Reading							.59	.35				
Step 2: H/W							.00	.35	.00			
2002 CTBS 3rd												
Step 1: Science										.55	.30	
Step 2: H/W										-.01	.30	.00

Note. H/W = Hispanic/White
This table is replicated in Appendix N, Table 49.

Discussion

The purpose of this investigation was to extend prior research conducted on the validity of Kentucky's Core Content Test, and thereby provide additional evidence for its validity. We expected KCCT and CTBS to correlate within the Goldilocks range. That is, because the assessments are designed to measure achievement differently and have differently formatted items, we did not expect the correlations to be exceptionally high. On the other hand, we did not expect the correlations to be too low due to overlap in the achievement domains (i.e., KCCT Math and CTBS Math both test achievement in mathematics).

The results from the correlation analyses support these expectations. Students who do well on CTBS can also be expected to do well on KCCT, and vice versa. The correlations between the two tests are strong, but not so strong as to indicate that the two tests are interchangeable. Consistent with prior research, Math demonstrated the best convergent validity (Bacci et al., 2003). A possible explanation for Math's strong convergent validity is that Math may have the most easily identifiable content domain. An easily identifiable content domain might result in highly similar items on the two tests, which could lead to higher convergent validity coefficients. In contrast, Social Studies demonstrated the weakest convergent validity. It may be that there are content coverage differences between the CTBS Social Studies test and the KCCT Social Studies test, more so than with the other content areas, such that correlations between the two are being depressed. Nonetheless, the convergent validity coefficients for Social Studies still fall within the Goldilocks range. Overall, these data provide strong evidence in support of KCCT as a valid measure of student achievement.

There are, however, some qualifications to these general conclusions, but none that diminish the basic findings. The finding that different content areas within the same measures were generally correlated as high, or higher, than the convergent validity coefficients warrants some discussion. This finding is consistent with Bacci et al.'s (2003) findings. The similar magnitudes for within-test intercorrelations and convergent validity coefficients could be the result of differences in item formats between the two tests. KCCT emphasizes open-response items, which require students to provide written responses or explanations. In contrast, CTBS uses only multiple-choice items. As a result, the difference in item formats on the two tests could be depressing the convergent validity coefficients. A second potential explanation for why the convergent validity coefficients were no stronger than the within-test intercorrelations is the length of time between administrations of the tests. Expectations regarding the relative strength of correlations are based on the finding that tests administered closer in time generally correlate higher than tests administered further apart in time due to similarity in test-taking circumstances (Campbell & Fiske, 1959). This could explain why CTBS intercorrelations and KCCT intercorrelations tend to be slightly higher than the convergent validity coefficients (recall that CTBS and KCCT are never administered within the same grade). A final potential explanation for why convergent validity coefficients did not clearly emerge as the highest correlations could be due to the existence of a "g-factor." In a recent study of school-level assessment scores, Sicoly discusses the existence of a general cognitive factor that "cuts across content areas" (Sicoly, 2002). If such a "g-factor" exists, then it would be expected that students with high ability would score well on any test, regardless of the content area. Consequently, if high ability

students consistently score well on all subjects and low ability students consistently score poorly on all subjects, then this could help account for the relatively high correlations that emerged between content areas within the same test.

In addition to examining correlations between KCCT and CTBS, we also compared performance on the two measures for students from varying backgrounds. The important validity issue was whether any differences between males and females, socioeconomic groups, or ethnic groups were larger for KCCT than for CTBS. Gender does not appear to influence KCCT scores any more than would be expected based on observed differences in CTBS scores. The possible exception to this general conclusion is that middle school females appear to have slightly higher KCCT Reading scores than would be expected from their CTBS scores. Bacci et al. (2003) similarly found that females tended to do better on KCCT Reading than would be expected from their ACT Reading scores. This observed difference may be due to the finding that females do better on written tests (Bridgeman & Morgan, 1996), and KCCT is a more writing oriented test than either ACT or CTBS. In regards to socioeconomic status, there are medium-size effects favoring students with higher SES across nearly all content areas for both KCCT and CTBS, thereby indicating that KCCT has no more differential impact for students with lower SES than CTBS. Only 5th grade KCCT Social Studies demonstrated slightly more differential impact for students with lower SES. This observed difference could be due to content coverage differences. It should also be noted that correlations between CTBS Social Studies and KCCT Social Studies were the smallest of all the convergent validity coefficients. These lower correlations mean that there is a greater portion of unexplained variance to be captured by SES; this may help explain why the regression coefficients tended to be larger for Social Studies. Finally, in regards to ethnicity, the effect size statistics indicate subtle differences between Whites and African Americans, and between Whites and Hispanics. However, the results from the regression analyses indicate that ethnicity does not appear to influence KCCT scores any more than would be expected based on observed differences in CTBS scores. Overall, KCCT appears to have no more differential impact than CTBS in regards to gender, socioeconomic status or ethnicity.

Conclusion

In sum, the results from this report provide strong convergent validity evidence for KCCT. It is clear from the data that students who perform well on CTBS can also be expected to perform well on KCCT, and vice versa. The correlations between the like subjects on the two achievement measures are well within the Goldilocks range, and with the possible exception of females' Reading scores, neither gender, ethnicity, nor socioeconomic status appear to influence KCCT scores any more than would be expected from observed differences in CTBS scores. In conclusion, this report further extends Bacci et al.'s (2003) research by providing additional validity evidence for KCCT.

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Appendix A

Table 1. Content Areas Tested by CTBS and KCCT for Each Grade

Grade	Test	Content Area
3rd	CTBS	Reading Reading Vocabulary Language Language Mechanics Math Math Computation Science Social Studies Spelling Word Analysis
4th	KCCT	Reading Science
5th	KCCT	Math Social Studies Arts & Humanities Practical Living/Vocational Studies
6th	CTBS	Reading Reading Vocabulary Language Language Mechanics Math Math Computation Science Social Studies Spelling
7th	KCCT	Reading Science
8th	KCCT	Math Social Studies Arts & Humanities Practical Living/Vocational Studies
9th	CTBS	Reading Reading Vocabulary Language Language Mechanics Math Math Computation Science Social Studies Spelling
10th	KCCT	Reading Practical Living/Vocational Studies
11th	KCCT	Math Social Studies Science Arts & Humanities

Appendix B

Table 2. KCCT Descriptive Statistics by Grade and Content Area for 1999 —Total Sample

		RD	SC	MA	SS	AH	PL
Grade 4	*M*	540.82	534.45	--	--	--	--
	SD	47.33	44.34	--	--	--	--
	N	49,101	49,101	--	--	--	--
Grade 5	*M*	--	--	548.46	533.33	499.57	498.68
	SD	--	--	49.14	42.70	71.06	70.92
	N	--	--	46,930	46,930	46,930	46,930
Grade 7	*M*	507.48	494.55	--	--	--	--
	SD	42.30	39.18	--	--	--	--
	N	48,457	48,457	--	--	--	--
Grade 8	*M*	--	--	519.90	500.02	497.62	497.78
	SD	--	--	51.53	50.70	67.87	68.66
	N	--	--	49,413	49,413	49,413	49,413
Grade 10	*M*	494.05	--	--	--	--	497.68
	SD	59.96	--	--	--	--	68.67
	N	46184	--	--	--	--	46184
Grade 11	*M*	--	531.99	519.41	534.30	496.53	--
	SD	--	51.32	60.51	61.99	68.09	--
	N	--	41,087	41,087	41,087	41,087	--

Note. *M* = Mean; *SD* = Standard Deviation; *N* = Sample Size.

Table 3. KCCT Descriptive Statistics by Grade and Content Area for 2000 —Total Sample

		RD	SC	MA	SS	AH	PL
Grade 4	*M*	542.46	538.14	--	--	--	--
	SD	44.16	41.43	--	--	--	--
	N	49,931	49,931	--	--	--	--
Grade 5	*M*	--	--	550.83	533.68	504.02	499.13
	SD	--	--	50.22	43.08	70.71	70.46
	N	--	--	48,654	48,654	48,654	48,654
Grade 7	*M*	507.25	495.51	--	--	--	--
	SD	41.18	39.46	--	--	--	--
	N	48,523	48,523	--	--	--	--
Grade 8	*M*	--	--	523.65	504.48	505.33	497.87
	SD	--	--	50.32	52.10	69.64	66.13
	N	--	--	47,943	47,943	47,943	47,943
Grade 10	*M*	500.21	--	--	--	--	499.70
	SD	60.91	--	--	--	--	67.37
	N	44,877	--	--	--	--	44,877
Grade 11	*M*	--	533.24	520.67	535.43	501.78	--
	SD	--	52.29	60.72	63.51	69.77	--
	N	--	40,980	40,980	40,980	40,980	--

Table 4. KCCT Descriptive Statistics by Grade and Content Area for 2001 — Total Sample

		RD	SC	MA	SS	AH	PL
Grade 4	*M*	543.18	541.64	--	--	--	--
	SD	44.70	42.79	--	--	--	--
	N	50,422	50,422	--	--	--	--
Grade 5	*M*	--	--	555.35	534.81	508.39	503.07
	SD	--	--	50.53	43.99	64.90	72.48
	N	--	--	49,744	49,744	49,744	49,744
Grade 7	*M*	509.30	497.03	--	--	--	--
	SD	40.211	39.19	--	--	--	--
	N	47,966	47,966	--	--	--	--
Grade 8	*M*	--	--	526.49	508.19	507.82	499.36
	SD	--	--	50.02	53.95	69.29	64.85
	N	--	--	48,105	48,105	48,105	48,105
Grade 10	*M*	501.93	--	--	--	--	499.10
	SD	62.23	--	--	--	--	67.02
	N	45,986	--	--	--	--	45,986
Grade 11	*M*	--	535.03	525.33	537.31	510.69	--
	SD	--	51.50	59.12	64.39	71.39	--
	N	--	39,832	39,832	39,832	39,832	--

Table 5. KCCT Descriptive Statistics by Grade and Content Area for 2002 — Total Sample

		RD	SC	MA	SS	AH	PL
Grade 4	*M*	544.44	542.19	--	--	--	--
	SD	44.71	42.24	--	--	--	--
	N	49,757	49,757	--	--	--	--
Grade 5	*M*	--	--	557.51	537.21	517.19	505.78
	SD	--	--	50.59	43.80	70.39	68.32
	N	--	--	50,488	50,488	50,488	50,488
Grade 7	*M*	510.46	499.61	--	--	--	--
	SD	40.04	39.57	--	--	--	--
	N	49,585	49,585	--	--	--	--
Grade 8	*M*	--	--	525.90	509.20	509.00	499.63
	SD	--	--	49.58	53.018	69.83	63.90
	N	--	--	47,923	47,923	47,923	47,923
Grade 10	*M*	500.01	--	--	--	--	499.94
	SD	61.90	--	--	--	--	67.53
	N	45,651	--	--	--	--	45,651
Grade 11	*M*	--	537.88	527.66	542.98	519.61	--
	SD	--	51.30	59.32	66.63	74.41	--
	N	--	40,966	40,966	40,966	40,966	--

Table 6. KCCT Descriptive Statistics by Grade and Content Area for 2003 —Total Sample

		RD	SC	MA	SS	AH	PL
Grade 4	*M*	546.24	546.63	--	--	--	--
	SD	44.57	41.45	--	--	--	--
	N	48,958	48,958	--	--	--	--
Grade 5	*M*	--	--	559.27	539.85	522.06	509.30
	SD	--	--	52.69	43.88	79.92	71.38
	N	--	--	49,971	49,971	49,971	49,971
Grade 7	*M*	512.01	500.46	--	--	--	--
	SD	40.47	39.52	--	--	--	--
	N	50,717	50,717	--	--	--	--
Grade 8	*M*	--	--	530.57	512.84	516.84	503.34
	SD	--	--	49.64	53.50	88.08	67.48
	N	--	--	49,572	49,572	49,572	49,572
Grade 10	*M*	504.90	--	--	--	--	504.43
	SD	61.52	--	--	--	--	69.77
	N	46,089	--	--	--	--	46,089
Grade 11	*M*	--	537.12	530.13	541.10	520.44	--
	SD	--	51.54	59.06	68.07	78.83	--
	N	--	40,968	40,968	40,968	40,968	--

Appendix C

Table 7. CTBS Descriptive Statistics by Grade and Content Area for 2001 — Total Sample

		Reading	Reading Vocab.	Language	Lang. Mechanics	Math	Math Computation	Total Score	Science	Social Studies	Spelling	Word Analysis
Grade 3	*M*	637.53	625.85	633.61	626.09	615.13	588.77	628.78	624.37	635.23	606.17	636.31
	SD	42.98	44.26	39.49	38.57	43.07	42.68	37.49	48.22	41.99	56.10	43.38
	N	49,678	27,957	49,671	27,967	49,664	27,957	49,650	28,343	28,239	27,942	27,860
Grade 6	*M*	662.76	655.29	659.73	656.15	662.26	650.86	661.62	667.47	664.28	655.29	--
	SD	41.41	42.95	43.18	43.19	49.77	45.37	40.01	45.56	40.52	45.81	--
	N	48,598	30,871	48,595	30,605	48,573	30,637	48,549	31,343	31,231	30,597	--
Grade 9	*M*	683.60	678.68	676.51	678.51	696.62	688.70	685.64	694.68	683.05	685.98	--
	SD	39.79	42.19	46.89	46.79	52.56	52.97	41.20	46.82	38.58	51.41	--
	N	49,988	23,640	49,980	23,638	49,953	24,006	49,890	25,376	25,012	23,621	--

Table 8. CTBS Descriptive Statistics by Grade and Content Area for 2002 — Total Sample

		Reading	Reading Vocab.	Language	Lang. Mechanics	Math	Math Computation	Total Score	Science	Social Studies	Spelling	Word Analysis
Grade 3	*M*	639.69	629.96	636.05	628.30	617.60	591.35	631.13	627.59	637.82	609.39	640.40
	SD	42.77	43.72	39.41	38.46	42.98	42.15	37.26	47.82	41.97	56.038	42.83
	N	48,623	28,122	48,618	28,123	48,627	28,107	48,605	29,004	28,996	28,114	28,128
Grade 6	*M*	663.53	657.05	659.91	656.66	664.11	652.42	662.54	669.20	665.89	655.88	--
	SD	41.28	42.22	42.82	42.47	48.96	45.44	39.57	44.94	40.06	45.53	--
	N	49,764	31,606	49,764	31,283	49,737	31,524	49,724	33,395	33,383	31,269	--
Grade 9	*M*	684.76	678.04	677.56	678.24	697.23	689.27	686.57	696.67	684.39	685.89	--
	SD	39.39	41.60	45.93	45.96	52.97	52.46	40.92	46.39	38.32	50.11	--
	N	50,471	26,626	50,466	26,073	50,421	26,651	50,389	27,963	27,534	26,039	--

Table 9. CTBS Descriptive Statistics by Grade and Content Area for 2003 —Total Sample

		Read-ing	Read-ing Vocab.	Lang-uage	Lang. Mech-anics	Math	Math Compu-tation	Total Score	Sci-ence	Social Studies	Spell-ing	Word Analy-sis
Grade 3	*M*	642.07	632.83	638.19	630.71	621.46	595.33	633.92	633.72	640.64	612.98	643.59
	SD	42.80	43.46	39.29	38.38	43.13	41.60	37.15	48.96	42.25	54.95	43.38
	N	48,007	26,922	48,002	26,918	47,999	26,797	47,991	28,944	28,930	26,911	26,924
Grade 6	*M*	664.81	657.45	661.11	657.53	665.53	653.62	663.84	670.27	666.35	656.98	--
	SD	41.30	42.35	43.49	42.43	49.43	46.19	39.87	45.55	40.17	45.58	--
	N	50,662	31,402	50,661	31,072	50,645	31,195	50,625	32,976	32,966	31,068	--
Grade 9	*M*	686.21	679.36	678.30	679.03	699.81	690.69	688.19	28,750	684.52	688.00	--
	SD	39.58	41.68	46.35	46.07	53.24	52.54	41.16	698.21	37.41	50.31	--
	N	50,102	27,003	50,101	26,295	50,041	26,516	49,995	47.35	28,682	26,273	--

Appendix D

Table 10. Percentage of Students Retained in CTBS and KCCT Merged Files

Files Merged	Merge cycle	Number Retained	Percent of KCCT Data File
2001 CTBS 3rd / 2002 KCCT 4th	1st Merge	30,949	62.20%
	2nd Merge	34,648	69.63%
	3rd Merge	41,751	83.91%
	4th Merge	**42,450**	**85.31%**
2001 CTBS 6th/ 2002 KCCT 7th	1st Merge	31,518	63.56%
	2nd Merge	34,277	69.13%
	3rd Merge	40,963	82.61%
	4th Merge	**41,691**	**84.08%**
2001 CTBS 9th / 2002 KCCT 10th	1st Merge	29,162	63.88%
	2nd Merge	31,466	68.93%
	3rd Merge	37,529	82.21%
	4th Merge	**38,151**	**83.57%**
2001 CTBS 3rd/ 2003 KCCT 5th	1st Merge	28,845	57.72%
	2nd Merge	32,163	64.36%
	3rd Merge	38,924	77.89%
	4th Merge	**39,734**	**79.51%**
2001 CTBS 6th/ 2003 KCCT 8th	1st Merge	29,479	59.47%
	2nd Merge	31,899	64.35%
	3rd Merge	38,392	77.45%
	4th Merge	**39,283**	**79.24%**
2001 CTBS 9th/ 2003 KCCT 11th	1st Merge	25,413	62.03%
	2nd Merge	27,572	67.30%
	3rd Merge	33,077	80.74%
	4th Merge	**33,754**	**82.39%**
2002 CTBS 3rd / 2003 KCCT 4th	1st Merge	30,654	62.61%
	2nd Merge	33,532	68.49%
	3rd Merge	40,269	82.25%
	4th Merge	**41,158**	**84.07%**

Files Merged	Merge cycle	Number Retained	Percent of KCCT Data File
2002 CTBS 6th/ 2003 KCCT 7th	1st Merge	31,846	62.79%
	2nd Merge	34,177	67.39%
	3rd Merge	41,435	81.70%
	4th Merge	**42,428**	**83.66%**
2002 CTBS 9th/ 2003 KCCT 10th	1st Merge	29,476	63.95%
	2nd Merge	31,574	68.51%
	3rd Merge	37,673	81.74%
	4th Merge	**38,488**	**83.51%**
2003 CTBS 6th/ 2002 KCCT 5th	1st Merge	32,850	65.06%
	2nd Merge	35,555	70.42%
	3rd Merge	42,829	84.83%
	4th Merge	**43,547**	**86.25%**
2003 CTBS 9th/ 2002 KCCT 8th	1st Merge	31,259	65.23%
	2nd Merge	33,485	69.87%
	3rd Merge	39,889	83.24%
	4th Merge	**40,536**	**84.59%**

Appendix E

Table 11. Descriptive Statistics for 2001 CTBS Grade 3 and 2002 KCCT Grade 4

	Matched			Unmatched		
2001 CTBS Grade 3	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	639.87	42.08	42,093	624.52	45.53	7,586
Reading Vocabulary	628.23	43.21	23,942	611.67	47.69	4,015
Language	635.87	38.92	42,088	621.06	40.32	7,584
Language Mechanics	628.18	37.89	23,950	613.63	40.21	4,017
Math	617.69	42.18	42,082	600.93	45.14	7,583
Math Computation	591.02	41.21	23,941	575.41	48.48	4,016
Total	631.16	36.60	42,073	615.54	39.57	7,578
Science	626.62	47.27	24,254	611.06	51.58	4,089
Social Studies	637.36	41.41	24,162	622.60	43.19	4,077
Spelling	609.11	54.95	23,929	588.67	59.60	4,013
Word Analysis	638.37	42.63	23,858	624.01	45.71	4,002
2002 KCCT Grade 4						
Reading	547.40	39.88	42,450	527.21	63.59	7,313
Science	544.90	37.03	42,450	526.40	62.51	7,313

Table 12. Descriptive Statistics for 2001 CTBS Grade 6 and 2002 KCCT Grade 7

	Matched			Unmatched		
2001 CTBS Grade 6	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	665.10	40.81	41,288	649.55	42.26	7,325
Reading Vocabulary	657.49	42.16	26,445	642.06	45.05	4,435
Language	662.26	42.68	41,285	645.39	43.17	7,325
Language Mechanics	658.91	42.18	26,207	639.72	45.41	4,406
Math	665.32	48.91	41,274	644.96	50.99	7,314
Math Computation	653.38	44.61	26,235	635.88	46.92	4,410
Total	664.25	39.39	41,260	646.72	40.22	7,304
Science	669.55	44.92	26,863	654.93	47.34	4,489
Social Studies	666.43	39.67	26,776	651.36	43.10	4,464
Spelling	657.76	44.76	26,196	640.59	49.10	4,409
2002 KCCT Grade 7						
Reading	513.31	37.25	41,691	495.44	49.75	7,902
Science	502.19	36.78	41,691	485.97	49.69	7,902

Table 13. Descriptive Statistics for 2001 CTBS Grade 9 and 2002 KCCT Grade 10

	Matched			Unmatched		
2001 CTBS Grade 9	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	689.94	37.57	37,635	664.30	40.14	12,358
Reading Vocabulary	684.35	40.49	17,872	661.14	42.53	5,770
Language	683.75	45.14	37,632	654.45	45.20	12,353
Language Mechanics	686.27	44.46	17,867	654.47	45.62	5,773
Math	705.13	50.40	37,620	670.67	50.47	12,338
Math Computation	697.43	49.55	18,156	661.57	54.05	5,852
Total	692.95	39.12	37,605	663.29	39.32	12,290
Science	701.22	44.82	19,164	674.50	47.10	6,214
Social Studies	688.91	36.49	18,897	664.94	39.23	6,117
Spelling	692.94	48.89	17,855	664.44	53.02	5,768
2002 KCCT Grade 10						
Reading	505.65	59.41	38,151	471.31	66.17	7,508
Practical Living	505.37	65.46	38,151	472.40	70.96	7,508

Table 14. Descriptive Statistics for 2001 CTBS Grade 3 and 2003 KCCT Grade 5

	Matched			Unmatched		
2001 CTBS Grade 3	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	640.54	42.07	39,426	625.91	44.46	10,257
Reading Vocabulary	628.66	43.05	22,466	614.35	47.18	5,496
Language	636.48	38.79	39,422	622.57	40.22	10,254
Language Mechanics	628.70	37.85	22,472	615.37	39.64	5,500
Math	618.38	42.07	39,417	602.21	44.57	10,252
Math Computation	591.51	41.01	22,464	577.59	47.37	5,498
Total	631.82	36.48	39,408	617.05	38.98	10,247
Science	627.27	47.18	22,766	612.55	50.57	5,582
Social Studies	637.80	41.40	22,680	624.70	42.71	5,564
Spelling	609.81	54.85	22,451	591.31	58.66	5,496
Word Analysis	638.75	42.57	22,388	626.30	45.25	5,477
2003 KCCT Grade 5						
Math	562.85	48.73	39,734	545.38	63.98	10,241
Social Studies	542.90	39.71	39,734	528.05	55.70	10,241
Arts & Humanities	526.74	78.39	39,734	503.91	83.17	10,241
Practical Living	512.99	69.98	39,734	494.99	74.87	10,241

Table 15. Descriptive Statistics for 2001 CTBS Grade 6 and 2003 KCCT Grade 8

	Matched			Unmatched		
2001 CTBS Grade 6	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	665.95	40.64	38,902	649.98	42.02	9,700
Reading Vocabulary	658.20	42.16	24,943	643.01	44.09	5,930
Language	663.16	42.53	38,889	645.96	43.02	9,700
Language Mechanics	659.85	41.99	24,720	640.61	44.70	5,887
Math	666.33	48.57	38,890	645.92	51.18	9,687
Math Computation	654.24	44.46	24,750	636.67	46.40	5,889
Total	665.17	39.19	38,877	647.37	40.11	9,676
Science	670.27	44.90	25,336	655.62	46.50	6,009
Social Studies	667.18	39.54	25,265	651.98	42.35	5,968
Spelling	658.45	44.62	24,712	642.01	48.31	5,887
2003 KCCT Grade 8						
Math	535.51	44.11	39,283	511.71	63.21	10,298
Social Studies	517.83	49.68	39,283	493.78	62.55	10,298
Arts & Humanities	524.40	85.76	39,283	487.95	90.80	10,298
Practical Living	508.68	64.86	39,283	482.96	73.14	10,298

Table 16. Descriptive Statistics for 2001 CTBS Grade 9 and 2003 KCCT Grade 11

	Matched			Unmatched		
2001 CTBS Grade 9	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	692.33	36.77	33,366	666.07	39.85	16,623
Reading Vocabulary	686.67	39.68	15,953	662.11	42.41	7,688
Language	686.63	44.41	33,364	656.19	45.12	16,617
Language Mechanics	689.18	43.72	15,952	656.39	45.17	7,687
Math	708.43	49.66	33,358	672.90	50.16	16,596
Math Computation	700.83	47.93	16,195	663.54	54.06	7,812
Total	695.80	38.32	33,345	665.18	39.13	16,546
Science	703.53	44.20	17,085	676.46	46.81	8,292
Social Studies	691.25	35.54	16,854	666.11	39.10	8,159
Spelling	695.35	48.25	15,946	666.52	52.31	7,676
2003 KCCT Grade 11						
Math	536.59	52.52	33,754	499.95	76.13	7,220
Social Studies	548.01	62.62	33,754	508.70	81.86	7,220
Science	542.52	44.07	33,754	511.85	72.25	7,220
Arts & Humanities	528.02	74.82	33,754	484.98	87.00	7,220

Table 17. Descriptive Statistics for 2002 CTBS Grade 3 and 2003 KCCT Grade 4

	Matched			Unmatched		
2002 CTBS Grade 3	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	641.90	42.21	40,799	628.20	43.85	7,826
Reading Vocabulary	632.09	42.89	23,760	618.37	46.30	4,364
Language	638.07	38.92	40,796	635.54	40.31	7,824
Language Mechanics	630.22	37.77	23,760	617.84	40.43	4,365
Math	619.83	42.33	40,802	605.98	44.47	7,827
Math Computation	593.29	41.05	23,745	580.72	46.31	4,364
Total	633.28	36.59	40,786	619.95	38.71	7,821
Science	629.58	47.17	24,457	616.84	49.81	4,549
Social Studies	639.63	41.54	24,448	628.08	42.92	4,550
Spelling	611.85	54.92	23,751	595.95	60.07	4,365
Word Analysis	642.35	42.26	23,764	629.77	44.33	4,366
2003 KCCT Grade 4						
Reading	548.62	40.07	41,158	533.69	61.69	7,810
Science	548.98	36.41	41,158	534.24	60.00	7,810

Table 18. Descriptive Statistics for 2002 CTBS Grade 6 and 2003 KCCT Grade 7

	Matched			Unmatched		
2002 CTBS Grade 6	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	665.78	40.72	41,985	651.40	42.18	7,784
Reading Vocabulary	659.13	41.70	26,800	645.44	43.20	4,807
Language	662.30	42.49	41,985	647.04	42.29	7,784
Language Mechanics	659.35	41.87	26,493	641.73	42.68	4,791
Math	667.07	48.13	41,974	648.11	50.34	7,768
Math Computation	655.09	44.52	26,726	637.50	47.57	4,800
Total	665.06	39.00	41,963	648.88	39.87	7,766
Science	671.28	44.67	28,372	657.43	44.66	5,025
Social Studies	667.99	39.49	28,363	654.03	41.21	5,022
Spelling	658.20	44.73	26,484	643.01	47.76	4,786
2003 KCCT Grade 7						
Reading	514.83	37.61	42,428	497.56	50.29	8,294
Science	503.12	36.77	42,428	486.85	49.10	8,294

Table 19. Descriptive Statistics for 2002 CTBS Grade 9 and 2003 KCCT Grade 10

	Matched			Unmatched		
2002 CTBS Grade 9	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	690.90	37.18	37,962	666.14	40.04	12,512
Reading Vocabulary	683.27	39.91	20,152	661.75	42.55	6,477
Language	684.54	44.28	37,961	656.36	44.32	12,508
Language Mechanics	685.46	43.86	19,733	655.78	45.09	6,343
Math	705.62	51.18	37,948	671.69	50.08	12,476
Math Computation	697.42	49.22	20,174	663.88	54.13	6,480
Total	693.70	38.98	37,939	664.86	38.98	12,453
Science	702.63	44.45	21,266	677.75	47.32	6,700
Social Studies	690.03	35.90	20,965	666.38	40.26	6,572
Spelling	692.28	47.95	19,712	666.01	51.44	6,330
2003 KCCT Grade 10						
Reading	510.81	58.50	38,488	474.94	67.42	7,611
Practical Living	510.16	67.44	38,488	475.42	74.02	7,611

Table 20. Descriptive Statistics for 2003 CTBS Grade 6 and 2002 KCCT Grade 5

	Matched			Unmatched		
2003 CTBS Grade 6	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	666.26	41.27	43,081	656.54	40.53	7,583
Reading Vocabulary	658.59	42.10	27,004	650.44	43.21	4,399
Language	662.68	43.38	43,081	652.18	43.04	7,582
Language Mechanics	659.35	41.85	26,692	646.45	44.24	4,381
Math	667.53	49.16	43,069	654.20	49.45	7,578
Math Computation	655.04	45.73	26,798	644.96	48.01	4,398
Total	665.51	39.74	43,053	654.34	39.27	7,574
Science	671.45	45.39	28,285	663.20	45.89	4,692
Social Studies	667.74	39.89	28,279	657.95	40.84	4,688
Spelling	658.22	45.15	26,687	649.47	47.43	4,382
2002 KCCT Grade 5						
Math	559.93	48.77	43,547	542.21	58.72	6,950
Social Studies	539.13	42.33	43,547	525.06	50.59	6,950
Arts & Humanities	519.89	70.02	43,547	500.11	70.46	6,950
Practical Living	508.31	67.55	43,547	489.81	71.00	6,950

Table 21. Descriptive Statistics for 2003 CTBS Grade 9 and 2002 KCCT Grade 8

	Matched			Unmatched		
2003 CTBS Grade 9	*M*	*SD*	*N*	*M*	*SD*	*N*
Reading	688.98	38.56	39,943	675.31	41.58	10,168
Reading Vocabulary	681.46	40.81	21,627	670.94	44.04	5,377
Language	681.30	45.58	39,943	666.49	47.48	10,167
Language Mechanics	682.66	45.01	21,112	664.27	47.38	5,184
Math	703.80	52.55	39,914	684.10	53.04	10,136
Math Computation	694.46	51.28	21,305	675.30	54.83	5,212
Total	691.41	40.36	39,894	675.48	41.81	10,110
Science	700.67	46.48	23,063	688.28	49.54	5,690
Social Studies	686.81	36.37	23,009	675.24	40.05	5,676
Spelling	691.08	49.16	21,101	675.48	52.95	5,173
2002 KCCT Grade 8						
Math	530.31	44.80	40,536	501.63	65.19	7,405
Social Studies	513.83	49.65	40,536	483.71	62.88	7,405
Arts & Humanities	514.71	67.44	40,536	477.64	74.28	7,405
Practical Living	504.51	61.63	40,536	472.84	69.27	7,405

Appendix F

Table 22. Correlations between 2002 KCCT Grade 4 and 2001 CTBS Grade 3

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
KCCT Grade 4													
1. Reading	1.00												
2. Science	*.80*	1.00											
CTBS Grade 3													
3. Reading	**.62**	**.57**	1.00										
4. Reading Vocabulary	**.59**	**.59**	*.71*	1.00									
5. Language	**.61**	**.54**	*.73*	*.69*	1.00								
6. Language Mechanics	**.52**	**.47**	*.59*	*.60*	*.65*	1.00							
7. Math	**.58**	**.56**	*.67*	*.63*	*.68*	*.62*	1.00						
8. Math Computation	**.45**	**.44**	*.51*	*.50*	*.55*	*.58*	*.66*	1.00					
9. Total	**.68**	**.63**	*.90*	*.76*	*.90*	*.70*	*.88*	*.64*	1.00				
10. Science	**.55**	**.58**	*.67*	*.64*	*.63*	*.52*	*.63*	*.48*	*.72*	1.00			
11. Social Studies	**.53**	**.51**	*.64*	*.62*	*.61*	*.53*	*.62*	*.47*	*.70*	*.62*	1.00		
12. Spelling	**.48**	**.39**	*.54*	*.58*	*.61*	*.60*	*.54*	*.50*	*.63*	*.44*	*.47*	1.00	
13. Word Analysis	**.53**	**.50**	*.63*	*.65*	*.66*	*.63*	*.64*	*.56*	*.73*	*.58*	*.55*	*.61*	1.00

Table 23. Correlations between 2002 KCCT Grade 7 and 2001 CTBS Grade 6

Variables	1	2	3	4	5	6	7	8	9	10	11	12
KCCT Grade 7												
1. Reading	1.00											
2. Science	*.79*	1.00										
CTBS Grade 6												
3. Reading	**.65**	**.63**	1.00									
4. Reading Vocabulary	**.63**	**.65**	*.73*	1.00								
5. Language	**.63**	**.60**	*.75*	*.69*	1.00							
6. Language Mechanics	**.61**	**.56**	*.62*	*.62*	*.65*	1.00						
7. Math	**.61**	**.63**	*.68*	*.66*	*.67*	*.66*	1.00					
8. Math Computation	**.53**	**.51**	*.55*	*.52*	*.56*	*.62*	*.68*	1.00				
9. Total	**.70**	**.69**	*.90*	*.78*	*.90*	*.72*	*.90*	*.67*	1.00			
10. Science	**.58**	**.65**	*.69*	*.70*	*.65*	*.55*	*.66*	*.51*	*.75*	1.00		
11. Social Studies	**.62**	**.64**	*.72*	*.72*	*.69*	*.62*	*.68*	*.56*	*.78*	*.72*	1.00	
12. Spelling	**.53**	**.46**	*.55*	*.58*	*.58*	*.60*	*.54*	*.49*	*.62*	*.48*	*.53*	1.00

Table 24. Correlations between 2002 KCCT Grade 10 and 2001 CTBS Grade 9

Variables	1	2	3	4	5	6	7	8	9	10	11	12
KCCT Grade 10												
1. Reading	1.00											
2. Practical Living	*.73*	1.00										
CTBS Grade 9												
3. Reading	**.71**	**.59**	1.00									
4. Reading Vocabulary	**.62**	**.54**	*.69*	1.00								
5. Language	**.66**	**.54**	*.73*	*.63*	1.00							
6. Language Mechanics	**.64**	**.53**	*.65*	*.57*	*.65*	1.00						
7. Math	**.63**	**.55**	*.66*	*.63*	*.62*	*.62*	1.00					
8. Math Computation	**.58**	**.49**	*.58*	*.54*	*.57*	*.60*	*.73*	1.00				
9. Total	**.75**	**.64**	*.88*	*.74*	*.88*	*.72*	*.88*	*.71*	1.00			
10. Science	**.61**	**.53**	*.69*	*.69*	*.62*	*.54*	*.67*	*.57*	*.72*	1.00		
11. Social Studies	**.61**	**.53**	*.69*	*.69*	*.62*	*.58*	*.66*	*.58*	*.74*	*.71*	1.00	
12. Spelling	**.58**	**.48**	*.60*	*.59*	*.59*	*.61*	*.56*	*.53*	*.66*	*.51*	*.55*	1.00

Table 25. Correlations between 2003 KCCT Grade 5 and 2001 CTBS Grade 3

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
KCCT Grade 5															
1. Math	1.00														
2. Social Studies	*.74*	1.00													
3. Arts & Humanities	*.62*	*.66*	1.00												
4. Practical Living	*.57*	*.63*	*.57*	1.00											
CTBS Grade 3															
5. Reading	**.55**	**.57**	**.53**	**.48**	1.00										
6. Reading Vocabulary	**.52**	**.54**	**.50**	**.44**	*.71*	1.00									
7. Language	**.57**	**.55**	**.52**	**.47**	*.73*	*.69*	1.00								
8. Language Mechanics	**.53**	**.48**	**.46**	**.40**	*.59*	*.59*	*.65*	1.00							
9. Math	**.63**	**.55**	**.50**	**.45**	*.67*	*.63*	*.67*	*.62*	1.00						
10. Math Computation	**.52**	**.44**	**.40**	**.36**	*.51*	*.50*	*.54*	*.58*	*.66*	1.00					
11. Total	**.66**	**.63**	**.58**	**.52**	*.90*	*.76*	*.89*	*.69*	*.88*	*.64*	1.00				
12. Science	**.54**	**.54**	**.48**	**.43**	*.67*	*.63*	*.63*	*.52*	*.63*	*.47*	*.72*	1.00			
13. Social Studies	**.51**	**.50**	**.46**	**.41**	*.64*	*.62*	*.61*	*.52*	*.61*	*.47*	*.70*	*.62*	1.00		
14. Spelling	**.45**	**.42**	**.41**	**.35**	*.53*	*.58*	*.61*	*.60*	*.54*	*.50*	*.63*	*.43*	*.46*	1.00	
15. Word Analysis	**.53**	**.49**	**.47**	**.41**	*.63*	*.65*	*.66*	*.63*	*.64*	*.56*	*.72*	*.58*	*.55*	*.61*	1.00

Table 26. Correlations between 2003 KCCT Grade 8 and 2001 CTBS Grade 6

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
KCCT Grade 8														
1. Math	1.00													
2. Social Studies	*.77*	1.00												
3. Arts & Humanities	*.64*	*.72*	1.00											
4. Practical Living	*.66*	*.72*	*.65*	1.00										
CTBS Grade 6														
5. Reading	**.61**	**.65**	**.56**	**.57**	1.00									
6. Reading Vocabulary	**.60**	**.65**	**.56**	**.60**	*.73*	1.00								
7. Language	**.59**	**.63**	**.55**	**.55**	*.75*	*.70*	1.00							
8. Language Mechanics	**.61**	**.59**	**.55**	**.53**	*.62*	*.62*	*.65*	1.00						
9. Math	**.70**	**.63**	**.55**	**.55**	*.68*	*.66*	*.67*	*.66*	1.00					
10. Math Computation	**.60**	**.54**	**.48**	**.47**	*.55*	*.52*	*.56*	*.62*	*.68*	1.00				
11. Total	**.71**	**.71**	**.62**	**.62**	*.90*	*.78*	*.90*	*.72*	*.90*	*.67*	1.00			
12. Science	**.60**	**.61**	**.51**	**.53**	*.69*	*.70*	*.64*	*.55*	*.66*	*.51*	*.74*	1.00		
13. Social Studies	**.62**	**.64**	**.55**	**.55**	*.72*	*.72*	*.69*	*.62*	*.68*	*.56*	*.78*	*.72*	1.00	
14. Spelling	**.48**	**.51**	**.46**	**.45**	*.55*	*.57*	*.58*	*.60*	*.54*	*.49*	*.62*	*.48*	*.53*	1.00

Table 27. Correlations between 2003 KCCT Grade 11 and 2001 CTBS Grade 9

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
KCCT Grade 11														
1. Math	1.00													
2. Social Studies	*.74*	1.00												
3. Science	*.78*	*.77*	1.00											
4. Arts & Humanities	*.66*	*.74*	*.67*	1.00										
CTBS Grade 9														
5. Reading	**.62**	**.65**	**.61**	**.60**	1.00									
6. Reading Vocabulary	**.59**	**.60**	**.61**	**.54**	*.69*	1.00								
7. Language	**.59**	**.59**	**.54**	**.55**	*.72*	*.62*	1.00							
8. Language Mechanics	**.59**	**.56**	**.52**	**.54**	*.64*	*.56*	*.64*	1.00						
9. Math	**.74**	**.62**	**.64**	**.55**	*.65*	*.63*	*.61*	*.61*	1.00					
10. Math Computation	**.68**	**.55**	**.55**	**.49**	*.57*	*.54*	*.56*	*.59*	*.72*	1.00				
11. Total	**.75**	**.71**	**.68**	**.64**	*.88*	*.73*	*.88*	*.71*	*.88*	*.71*	1.00			
12. Science	**.61**	**.59**	**.64**	**.51**	*.64*	*.69*	*.57*	*.52*	*.67*	*.57*	*.71*	1.00		
13. Social Studies	**.60**	**.63**	**.62**	**.54**	*.68*	*.69*	*.61*	*.56*	*.65*	*.57*	*.73*	*.71*	1.00	
14. Spelling	**.52**	**.53**	**.48**	**.49**	*.59*	*.58*	*.59*	*.61*	*.55*	*.52*	*.65*	*.50*	*.53*	1.00

Table 28. Correlations between 2003 KCCT Grade 4 and 2002 CTBS Grade 3

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
KCCT Grade 4													
1. Reading	1.00												
2. Science	*.80*	1.00											
CTBS Grade 3													
3. Reading	**.59**	**.55**	1.00										
4. Reading Vocabulary	**.56**	**.52**	*.69*	1.00									
5. Language	**.59**	**.53**	*.73*	*.68*	1.00								
6. Language Mechanics	**.51**	**.46**	*.58*	*.58*	*.65*	1.00							
7. Math	**.55**	**.53**	*.66*	*.62*	*.67*	*.62*	1.00						
8. Math Computation	**.43**	**.41**	*.50*	*.50*	*.53*	*.57*	*.64*	1.00					
9. Total	**.69**	**.60**	*.90*	*.75*	*.89*	*.69*	*.88*	*.63*	1.00				
10. Science	**.52**	**.55**	*.66*	*.63*	*.61*	*.52*	*.63*	*.47*	*.71*	1.00			
11. Social Studies	**.50**	**.49**	*.63*	*.60*	*.60*	*.52*	*.60*	*.45*	*.69*	*.62*	1.00		
12. Spelling	**.45**	**.37**	*.53*	*.56*	*.60*	*.61*	*.53*	*.49*	*.62*	*.42*	*.45*	1.00	
13. Word Analysis	**.51**	**.48**	*.62*	*.63*	*.66*	*.63*	*.63*	*.55*	*.72*	*.56*	*.54*	*.61*	1.00

Table 29. Correlations between 2003 KCCT Grade 7 and 2002 CTBS Grade 6

Variables	1	2	3	4	5	6	7	8	9	10	11	12
KCCT Grade 7												
1. Reading	1.00											
2. Science	*.79*	1.00										
CTBS Grade 6												
3. Reading	**.64**	**.62**	1.00									
4. Reading Vocabulary	**.62**	**.64**	*.73*	1.00								
5. Language	**.62**	**.60**	*.75*	*.68*	1.00							
6. Language Mechanics	**.61**	**.55**	*.62*	*.61*	*.64*	1.00						
7. Math	**.60**	**.62**	*.67*	*.65*	*.66*	*.65*	1.00					
8. Math Computation	**.54**	**.52**	*.56*	*.53*	*.56*	*.62*	*.68*	1.00				
9. Total	**.70**	**.69**	*.90*	*.77*	*.89*	*.72*	*.88*	*.68*	1.00			
10. Science	**.57**	**.66**	*.69*	*.70*	*.64*	*.55*	*.66*	*.51*	*.74*	1.00		
11. Social Studies	**.61**	**.64**	*.72*	*.71*	*.68*	*.60*	*.67*	*.56*	*.78*	*.72*	1.00	
12. Spelling	**.53**	**.46**	*.56*	*.58*	*.58*	*.61*	*.54*	*.49*	*.63*	*.48*	*.53*	1.00

Table 30. Correlations between 2003 KCCT Grade 10 and 2002 CTBS Grade

Variables	1	2	3	4	5	6	7	8	9	10	11	12
KCCT Grade 10												
1. Reading	1.00											
2. Practical Living	*.70*	1.00										
CTBS Grade 9												
3. Reading	**.70**	**.58**	1.00									
4. Reading Vocabulary	**.61**	**.52**	*.69*	1.00								
5. Language	**.65**	**.53**	*.72*	*.62*	1.00							
6. Language Mechanics	**.64**	**.51**	*.64*	*.58*	*.64*	1.00						
7. Math	**.63**	**.53**	*.66*	*.63*	*.62*	*.62*	1.00					
8. Math Computation	**.58**	**.48**	*.59*	*.55*	*.56*	*.61*	*.74*	1.00				
9. Total	**.75**	**.62**	*.88*	*.73*	*.88*	*.72*	*.88*	*.72*	1.00			
10. Science	**.57**	**.49**	*.65*	*.70*	*.57*	*.53*	*.67*	*.58*	*.72*	1.00		
11. Social Studies	**.61**	**.51**	*.68*	*.69*	*.61*	*.58*	*.66*	*.59*	*.74*	*.70*	1.00	
12. Spelling	**.57**	**.45**	*.59*	*.57*	*.59*	*.61*	*.55*	*.53*	*.65*	*.50*	*.50*	1.00

Table 31. Correlations between 2002 KCCT Grade 5 and 2003 CTBS Grade 6

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
KCCT Grade 5														
1. Math	1.00													
2. Social Studies	*.79*	1.00												
3. Arts & Humanities	*.63*	*.69*	1.00											
4. Practical Living	*.61*	*.67*	*.60*	1.00										
CTBS Grade 6														
5. Reading	**.60**	**.62**	**.53**	**.52**	1.00									
6. Reading Vocabulary	**.58**	**.60**	**.53**	**.50**	*.73*	1.00								
7. Language	**.58**	**.58**	**.52**	**.50**	*.75*	*.69*	1.00							
8. Language Mechanics	**.57**	**.52**	**.49**	**.47**	*.63*	*.61*	*.65*	1.00						
9. Math	**.68**	**.58**	**.52**	**.49**	*.67*	*.65*	*.66*	*.66*	1.00					
10. Math Computation	**.55**	**.47**	**.43**	**.41**	*.55*	*.52*	*.56*	*.61*	*.68*	1.00				
11. Total	**.70**	**.66**	**.58**	**.56**	*.90*	*.77*	*.89*	*.73*	*.89*	*.67*	1.00			
12. Science	**.57**	**.57**	**.49**	**.47**	*.69*	*.70*	*.65*	*.56*	*.66*	*.52*	*.75*	1.00		
13. Social Studies	**.58**	**.60**	**.51**	**.49**	*.72*	*.72*	*.69*	*.61*	*.68*	*.56*	*.78*	*.72*	1.00	
14. Spelling	**.46**	**.45**	**.42**	**.40**	*.55*	*.56*	*.57*	*.61*	*.53*	*.48*	*.62*	*.48*	*.53*	1.00

Table 32. Correlations between 2002 KCCT Grade 8 and 2003 CTBS Grade 9

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
KCCT Grade 8														
1. Math	1.00													
2. Social Studies	*.79*	1.00												
3. Arts & Humanities	*.67*	*.76*	1.00											
4. Practical Living	*.65*	*.74*	*.68*	1.00										
CTBS Grade 9														
5. Reading	**.62**	**.68**	**.59**	**.57**	1.00									
6. Reading Vocabulary	**.58**	**.63**	**.53**	**.51**	*.71*	1.00								
7. Language	**.58**	**.62**	**.55**	**.53**	*.74*	*.64*	1.00							
8. Language Mechanics	**.59**	**.61**	**.55**	**.52**	*.66*	*.60*	*.66*	1.00						
9. Math	**.72**	**.65**	**.59**	**.54**	*.67*	*.65*	*.64*	*.64*	1.00					
10. Math Computation	**.65**	**.58**	**.50**	**.48**	*.60*	*.56*	*.57*	*.62*	*.74*	1.00				
11. Total	**.73**	**.73**	**.64**	**.61**	*.89*	*.75*	*.89*	*.73*	*.89*	*.72*	1.00			
12. Science	**.61**	**.60**	**.50**	**.48**	*.66*	*.70*	*.59*	*.55*	*.68*	*.58*	*.72*	1.00		
13. Social Studies	**.59**	**.63**	**.52**	**.50**	*.69*	*.70*	*.63*	*.59*	*.66*	*.59*	*.74*	*.71*	1.00	
14. Spelling	**.52**	**.55**	**.50**	**.47**	*.61*	*.60*	*.60*	*.62*	*.57*	*.54*	*.67*	*.52*	*.56*	1.00

Appendix G

Table 33. Files Included in Demographic Analyses

Merged Files:

1. 2001 CTBS 3rd Grade/ 2003 KCCT 5th Grade
2. 2001 CTBS 6th Grade/ 2003 KCCT 8th Grade
3. 2001 CTBS 9th Grade/ 2003 KCCT 11th Grade
4. 2002 CTBS 3rd Grade/ 2003 KCCT 4th Grade
5. 2002 CTBS 6th Grade/ 2003 KCCT 7th Grade
6. 2002 CTBS 9th Grade/ 2003 KCCT 10th Grade

Appendix H

Table 34. CTBS Descriptive Statistics by Gender

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2001 3rd	Male	617.63	43.30	19,954	-.04	636.97	42.20	11,542	-.04								
	Female	619.17	40.73	19,431		638.68	40.54	11,121									
2001 6th	Male	664.70	51.27	19,214	-.07	666.40	42.21	12,497	-.04								
	Female	667.94	45.71	19,649		667.97	36.71	12,752									
2001 9th	Male	711.34	51.93	16,216	.11	692.77	40.36	8,198	.08								
	Female	705.68	47.24	17,129		689.80	30.12	8,648									
2002 3rd	Male									639.20	42.76	20,516	-.13	632.65	49.45	12,289	.13
	Female									644.62	41.36	19,986		626.35	44.44	11,944	
2002 6th	Male									662.02	42.18	21,081	-.19	674.01	47.29	14,265	.12
	Female									669.59	38.80	20,867		668.53	41.68	14,088	
2002 9th	Male									684.11	37.31	18,693	-.37				
	Female									697.52	35.84	19,243					

Note. *M* = Mean; *SD* = Standard Deviation; *N* = Sample Size; *ES* = Effect Size.

Table 35. KCCT Descriptive Statistics by Gender

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2003 4th	Male									543.20	40.07	20,715	-.28	548.74	37.77	20,715	-.01
	Female									554.29	39.01	20,138		549.28	34.71	20,138	
2003 5th	Male	561.39	50.04	20,136	-.06	541.07	39.36	20,136	-.09								
	Female	564.40	47.23	19,563		544.83	39.94	19,563									
2003 7th	Male									507.10	37.34	21,336	-.43	502.74	38.24	21,336	-.03
	Female									522.86	35.77	21,054		503.67	34.82	21,054	
2003 8th	Male	533.61	46.23	19,437	-.09	512.52	49.12	19,437	-.21								
	Female	537.43	41.76	19,817		523.09	49.62	19,817									
2003 10th	Male									498.12	58.72	18,979	-.44				
	Female									523.23	55.50	19,482					
2003 11th	Male	535.22	55.62	16,439	-.05	543.86	63.95	16,439	-.13								
	Female	537.89	49.36	17,302		551.98	61.06	17,302									

Appendix I

Table 36. Regression Results Showing Gender Effects in Elementary School

	2003 KCCT 5th Grade											
	Math			Social Studies			Reading			Science		
Predictors:	ß	R^2	$?R^2$	ß	R^2	$?R^2$	ß	R^2	$?R^2$	ß	R^2	$?R^2$
2001 CTBS 3rd												
Step 1: Math	.63	.40										
Step 2: Gender	.02	.40	.00									
2001 CTBS 3rd												
Step 1: Social Studies				.50	.25							
Step 2: Gender				.04	.26	.00						
	2003 KCCT 4th Grade											
2002 CTBS 3rd												
Step 1: Reading							.59	.35				
Step 2: Gender							.11	.37	.01			
2002 CTBS 3rd												
Step 1: Science										.55	.30	
Step 2: Gender										.04	.30	.00

Note. ß = Standardized Regression Coefficient; R^2 = Multiple Regression Coefficient; $?R^2$ = Change in R^2.

Table 37. Regression Results Showing Gender Effects in Middle School

	2003 KCCT 8th Grade											
	Math			Social Studies			Reading			Science		
Predictors:	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2
2001 CTBS 6th												
Step 1: Math	.70	.49										
Step 2: Gender	.02	.49	.00									
2001 CTBS 6th												
Step 1: Social Studies				.64	.41							
Step 2: Gender				.09	.42	.01						
	2003 KCCT 7th Grade											
2002 CTBS 6th												
Step 1: Reading							.64	.41				
Step 2: Gender							.17	.44	.03			
2002 CTBS 6th												
Step 1: Science										.66	.43	
Step 2: Gender										.05	.43	.00

Table 38. Regression Results Showing Gender Effects in High School

	2003 KCCT 11th Grade								
	Math			Social Studies			Reading		
Predictors:	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2
2001 CTBS 9th									
Step 1: Math	.74	.55							
Step 2: Gender	.06	.55	.00						
2001 CTBS 9th									
Step 1: Social Studies				.63	.39				
Step 2: Gender				.10	.40	.01			
	2003 KCCT 10th Grade								
2002 CTBS 9th									
Step 1: Reading							.70	.49	
Step 2: Gender							.10	.50	.01

Appendix J

Table 39. CTBS Descriptive Statistics by SES

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2001 3rd	Lower	606.29	39.89	19,543	-.58	626.86	38.65	11,106	-.52								
	Higher	629.75	40.85	11,912		647.71	41.09	7,186									
2001 6th	Lower	649.23	47.08	16,694	-.62	653.05	37.18	10,874	-.62								
	Higher	677.75	45.49	10,601		676.05	37.38	6,906									
2001 9th	Lower	686.36	47.74	9,717	-.61	677.14	33.45	4,940	-.55								
	Higher	715.05	46.78	10,420		696.01	34.90	4,778									
2002 3rd	Lower									630.75	40.16	20,368	-.56	617.20	45.12	11,928	-.54
	Higher									653.51	41.26	13,005		641.76	46.58	8,348	
2002 6th	Lower									652.14	38.38	18,739	-.63	656.09	41.16	12,547	-.65
	Higher									676.79	39.49	10,883		683.55	42.98	7,628	
2002 9th	Lower									677.02	36.90	12,898	-.57				
	Higher									698.23	37.61	24,660					

Table 40. KCCT Descriptive Statistics by SES

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2003 4th	Lower									539.38	38.74	20,569	-.50	541.11	35.71	20,569	-.47
	Higher									558.58	37.39	13,081		557.48	33.24	13,081	
2003 5th	Lower	549.48	45.94	19,724	-.59	532.04	37.77	19,724	-.61								
	Higher	576.49	46.12	11,977		554.66	36.89	11,977									
2003 7th	Lower									503.54	36.53	18,999	-.61	491.84	36.44	18,999	-.61
	Higher									524.98	34.18	10,947		512.86	32.57	10,947	
2003 8th	Lower	520.51	45.05	16,946	-.61	500.05	46.84	16,946	-.66								
	Higher	545.83	38.37	10,670		530.63	46.45	10,670									
2003 10th	Lower									487.75	55.93	13,187	-.67				
	Higher									525.00	55.07	11,866					
2003 11th	Lower	515.22	54.17	9,924	-.55	523.02	60.10	9,924	-.57								
	Higher	543.39	48.77	10,497		557.58	61.00	10,497									

Appendix K

Table 41. Regression Results Showing SES Effects in Elementary School

	2003 KCCT 5th Grade											
	Math			Social Studies			Reading			Science		
Predictors:	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2
2001 CTBS 3rd												
Step 1: Math	.63	.40										
Step 2: SES	.12	.41	.01									
2001 CTBS 3rd												
Step 1: Social Studies				.51	.26							
Step 2: SES				.17	.29	.03						
	2003 KCCT 4th Grade											
2002 CTBS 3rd												
Step 1: Reading							.60	.36				
Step 2: SES							.11	.37	.01			
2002 CTBS 3rd												
Step 1: Science										.55	.31	
Step 2: SES										.11	.32	.01

Table 42. Regression Results Showing SES Effects in Middle School

	2003 KCCT 8th Grade											
	Math			Social Studies			Reading			Science		
Predictors:	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2
2001 CTBS 6th												
Step 1: Math	.69	.47										
Step 2: SES	.10	.48	.01									
2001 CTBS 6th												
Step 1: Social Studies				.64	.41							
Step 2: SES				.14	.43	.02						
	2003 KCCT 7th Grade											
2002 CTBS 6th												
Step 1: Reading							.65	.42				
Step 2: SES							.12	.43	.01			
2002 CTBS 6th												
Step 1: Science										.66	.44	
Step 2: SES										.12	.45	.01

Table 43. Regression Results Showing SES Effects in High School

Predictors:	Math ß	Math R^2	Math ?R^2	Social Studies ß	Social Studies R^2	Social Studies ?R^2	Reading ß	Reading R^2	Reading ?R^2
2003 KCCT 11th Grade									
2001 CTBS 9th									
Step 1: Math	.74	.54							
Step 2: SES	.06	.55	.00						
2001 CTBS 9th									
Step 1: Social Studies				.64	.41				
Step 2: SES				.13	.43	.02			
2003 KCCT 10th Grade									
2002 CTBS 9th									
Step 1: Reading							.71	.50	
Step 2: SES							.13	.52	.02

Appendix L

Table 44. CTBS Descriptive Statistics by Ethnicity

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2001 3rd	White	621.31	41.60	33,644		640.35	41.43	19,726									
	A.A.	596.80	39.25	4,600	.61	616.70	34.58	2,247	.62								
	Hispanic	612.27	38.48	357	.22	629.79	42.02	214	.25								
2001 6th	White	670.31	47.13	33,656		670.89	38.55	21,482									
	A.A.	634.07	47.86	4,118	.76	640.89	36.68	3,041	.79								
	Hispanic	657.25	43.13	321	.29	658.50	33.18	211	.34								
2001 9th	White	711.28	48.60	29,438		692.82	35.23	14,892									
	A.A.	678.45	46.75	2,989	.69	674.12	31.29	1,456	.56								
	Hispanic	699.34	52.71	252	.24	684.44	36.73	137	.23								
2002 3rd	White									644.83	41.82	34,915		632.42	46.51	21,607	
	A.A.									621.67	39.54	4,515	.57	601.17	44.18	2,056	.69
	Hispanic									625.29	39.63	417	.48	616.85	50.35	239	.32
2002 6th	White									668.98	40.14	36,294		675.53	43.47	24,262	
	A.A.									641.08	36.88	4,503	.72	640.44	41.17	3,286	.83
	Hispanic									658.77	36.21	369	.27	665.23	39.43	246	.25
2002 9th	White									692.96	36.49	33,269					
	A.A.									671.40	36.91	3,625	.59				
	Hispanic									683.96	37.41	279	.24				

Note. A.A. = African American

Table 45. KCCT Descriptive Statistics by Ethnicity

Data File:	Sub-Group:	Math				Social Studies				Reading				Science			
		M	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*	*M*	*SD*	*N*	*ES*
2003 4th	White									551.01	39.31	35,131		551.49	35.50	35,131	
	A.A.									532.68	38.36	4,543	.47	532.21	34.55	4,543	.55
	Hispanic									531.58	55.87	488	.40	532.10	53.68	488	.43
2003 5th	White	565.82	48.04	33,843		545.49	39.17	33,843									
	A.A.	540.75	46.29	4,629	.53	524.43	37.89	4,629	.55								
	Hispanic	552.02	53.36	408	.27	532.13	44.82	408	.32								
2003 7th	White									517.38	36.25	36,550		506.33	34.76	36,550	
	A.A.									496.08	39.34	4,568	.56	479.43	40.01	4,568	.72
	Hispanic									499.44	53.92	446	.39	487.54	51.89	446	.43
2003 8th	White	538.99	41.87	33,893		521.50	48.32	33,893									
	A.A.	507.65	49.90	4,173	.68	488.69	49.00	4,173	.68								
	Hispanic	523.95	47.35	382	.34	503.68	52.58	382	.36								
2003 10th	White									513.92	57.42	33,613					
	A.A.									482.65	58.05	3,698	.54				
	Hispanic									490.42	63.49	354	.38				
2003 11th	White	517.38	36.25	36,550		506.33	34.76	36,550									
	A.A.	496.08	39.34	4,568	.56	479.43	40.01	4,568	.72								
	Hispanic	499.44	53.92	446	.39	487.54	51.89	446	.43								

Appendix M

Table 46. Regression Results Showing Ethnicity Effects (African American/White) in Elementary School

	2003 KCCT 5th Grade											
	Math			Social Studies			Reading			Science		
Predictors:	ß	R^2	$?R^2$	ß	R^2	$?R^2$	ß	R^2	$?R^2$	ß	R^2	$?R^2$
2001 CTBS 3rd												
Step 1: Math	.63	.40										
Step 2: AA/W	-.06	.40	.00									
2001 CTBS 3rd												
Step 1: Social Studies				.50	.25							
Step 2: AA/W				-.09	.26	.01						
	2003 KCCT 4th Grade											
2002 CTBS 3rd												
Step 1: Reading							.59	.35				
Step 2: AA/W							-.06	.36	.00			
2002 CTBS 3rd												
Step 1: Science										.55	.30	
Step 2: AA/W										-.07	.31	.01

Note. AA/W = African American/White

Table 47. Regression Results Showing Ethnicity Effects (African American/White) in Middle School

	2003 KCCT 8th Grade											
	Math			Social Studies			Reading			Science		
Predictors:	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2
2001 CTBS 6th												
Step 1: Math	.70	.49										
Step 2: AA/W	-.07	.49	.00									
2001 CTBS 6th												
Step 1: Social Studies				.64	.41							
Step 2: AA/W				-.08	.42	.001						
	2003 KCCT 7th Grade											
2002 CTBS 6th												
Step 1: Reading							.64	.41				
Step 2: AA/W							-.05	.41	.00			
2002 CTBS 6th												
Step 1: Science										.66	.43	
Step 2: AA/W										-.10	.44	.01

Table 48. Regression Results Showing Ethnicity Effects (African American/White) in High School

	2003 KCCT 11th Grade								
	Math			Social Studies			Reading		
Predictors:	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2
2001 CTBS 9th									
Step 1: Math	.74	.55							
Step 2: AA/W	-.05	.55	.00						
2001 CTBS 9th									
Step 1: Social Studies				.63	.39				
Step 2: AA/W				-.04	.40	.00			
	2003 KCCT 10th Grade								
2002 CTBS 9th									
Step 1: Reading							.70	.49	
Step 2: AA/W							-.04	.49	.00

Appendix N

Table 49. Regression Results Showing Ethnicity Effects (Hispanic/White) in Elementary School

	Math			Social Studies			Reading			Science		
Predictors:	ß	R^2	$?R^2$	ß	R^2	$?R^2$	ß	R^2	$?R^2$	ß	R^2	$?R^2$
2003 KCCT 5th Grade												
2001 CTBS 3rd												
Step 1: Math	.63	.40										
Step 2: H/W	.00	.40	.00									
2001 CTBS 3rd												
Step 1: Social Studies				.50	.25							
Step 2: H/W				.00	.25	.00						
2003 KCCT 4th Grade												
2002 CTBS 3rd												
Step 1: Reading							.59	.35				
Step 2: H/W							.00	.35	.00			
2002 CTBS 3rd												
Step 1: Science										.55	.30	
Step 2: H/W										-.01	.30	.00

Note. H/W = Hispanic/White

Table 50. Regression Results Showing Ethnicity Effects (Hispanic/White) in Middle School

	2003 KCCT 8th Grade											
	Math			Social Studies			Reading			Science		
Predictors:	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2
2001 CTBS 6th												
Step 1: Math	.70	.49										
Step 2: H/W	.00	.49	.00									
2001 CTBS 6th												
Step 1: Social Studies				.64	.41							
Step 2: H/W				.00	.41	.00						
	2003 KCCT 7th Grade											
2002 CTBS 6th												
Step 1: Reading							.64	.41				
Step 2: H/W							.00	.41	.00			
2002 CTBS 6th												
Step 1: Science										.66	.43	
Step 2: H/W										-.01	.43	.00

Table 51. Regression Results Showing Ethnicity Effects (Hispanic/White) in High School

	2003 KCCT 11th Grade								
	Math			Social Studies			Reading		
Predictors:	ß	R^2	?R^2	ß	R^2	?R^2	ß	R^2	?R^2
2001 CTBS 9th									
Step 1: Math	.74	.55							
Step 2: H/W	.01	.55	.00						
2001 CTBS 9th									
Step 1: Social Studies				.63	.39				
Step 2: H/W				.01	.39	.00			
	2003 KCCT 10th Grade								
2002 CTBS 9th									
Step 1: Reading							.70	.49	
Step 2: H/W							.00	.49	.00